The Builder.

The Condition of London Question.

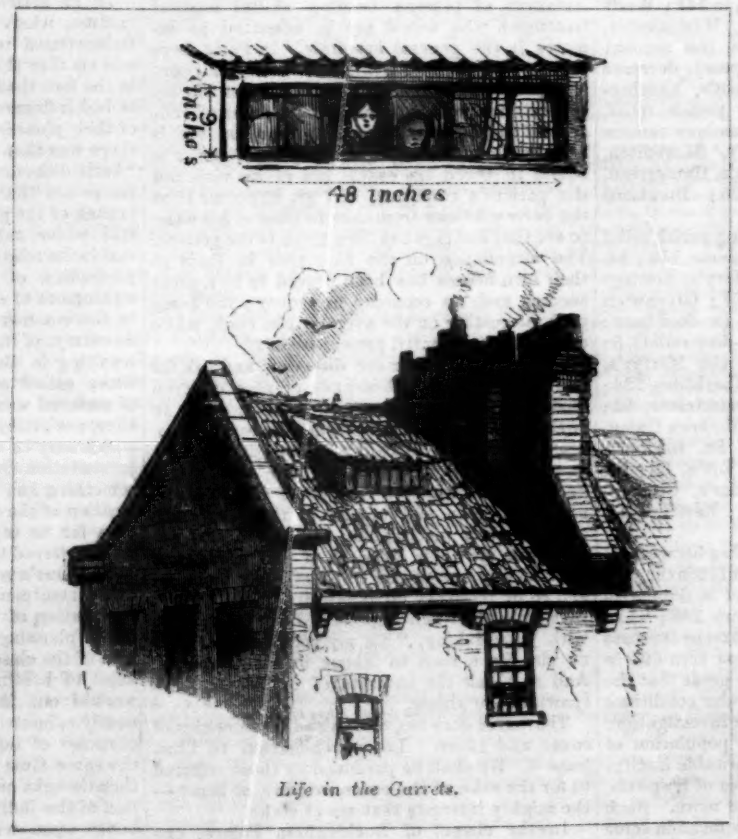
EARTY efforts are being made by many of our contemporaries, and with success, to bring relief to the distressed thousands to be found in our many-sided metropolis. We cannot better commence our new volume than with some observations bearing on the condition of London, and some of the causes of the sickness, destitution, and crime to be found in it. We are glad to notice that several persons who themselves have investigated Clerkenwell, St. Giles's, Golden-lane, Bethnal-green, and other parts which are extensively occupied by the poor, are making known through various channels the results of their observations. The accounts, as our readers are prepared to expect, are most distressing. Mr. G. W. M'Cree, in a walk during a few hours in St. Giles's, found the following cases:—An artisan, who with his wife and two children have had typhus fever; his wife is dead; two fingers of the man's hand have been poisoned, and he cannot do any work at present. In another place, an aged woman, deformed, gets her living by needle-work; she earns 4d. a day. A mother and two sons, husband dead, have all had typhus fever; landlord has taken their bed for rent. A poor man's wife "confined" in a cold cellar. In another place, a widow, son, and two other children; the boy, his mother's chief support, has lost one eye, and will probably lose the other; could not pay their rent, and had spent two cold nights in the streets. A mother, a Frenchwoman, in a bed on the floor, with her newly-born child beside her; her husband is dead in the hospital, but they dare not tell her; five children are left; her husband was a refugee. In another place, up a dark pair of stairs, in a back room, Mr. M'Cree found the dead body of a man; he was not in a coffin, although he had been dead for four days; "his ghastly face was exposed to the view of the children, who were playing near the corpse." Such are the views shown by a short walk in this parish. From other places we have similar tales. From Bethnal-green comes the usual weekly report of death from sheer starvation, pestilent rooms, fever close to ill-drained water-closets, and yards on which the surface water stands, short water supply, and those other evil conditions to which we have so often directed attention. Each year's observations show how much our accounts have been under-stated.

A word or two here as to one of those evil conditions. It is a fact, to which we have before directed attention, that during the raging of the cholera the disease was found more fatal proportionately in the kitchens and in the attics of tenemented dwellings than in the other parts of houses; and the same may be said of several disorders which depend in a great measure on atmospheric derangement for their commencement and encouragement. It is true that it is in the basement and upper parts of houses of this class the greatest extent of poverty and privation is to be found, and this predisposes to disease; but the main cause of the extra sickness in these places is the want of attention to ventilation. In many such cases, indeed, ventilation is not possible. Take, as an example, the specimen which is engraved. In a large well-built house, part of the front of which is used as a shop, and where the rooms are let to different families—the garret as well as other rooms—the only space for light and ventilation in the garret is a window, containing five panes of glass, 8 in. wide by 9 in. high: two only of these squares seem to be made to open. During the summer weather the sun beats on the roof, causing a most unwholesome and intolerable heat, and to this is sometimes added the heat of the fire needed for cooking and other operations. When we consider this, as well as the number of people who, in the present transition state of the metropolitan dwellings, are forced to live together, the unsanitary construction of the staircases, and the common practice, even when some amount of ventilation might be afforded, of keeping the windows closed at night, we need not wonder at the unhealthiness of such places. A large part of the vitiated air of the house finds its way into the upper stories. Many of the higher portions of old-fashioned inns, and, indeed, houses of other descriptions, want careful attention as regards the apartments in which the servants usually sleep.

In the metropolis there are numbers of the servants of tradespeople, and of those more opulent, who are removed to their homes or to the fever hospital, stricken with dangerous disease, owing, in many cases, to the bad construction of the apartments in which they sleep.

A reference to the engraving will show, that the floor of the garret is level with the eaves of the roof; and then a part of the narrow end of the angle formed by the roof is partitioned off, which limits the central space. With a little contrivance those upper stories might be rendered more wholesome: there would often, for instance, be no difficulty in opening another small window on the other side of the roof. In Bethnal-green and Spitalfields, many of the upper rooms are better conditioned than are those in most other neighbourhoods; the cause being that they were used by the silk-weavers as work-shops, and large lights were needed on both sides; so that now those places having in many instances been transformed into homes for families, they have not only the advantage of good light, but also, if the tenants think fit, plenty of ventilation. We not long since urged the heads of families to make sanitary inspection of the back part of their houses. Let us now suggest that advantage would result from occasional visits to the upper regions.

In a house situate as is the one of which we engrave a sketch of the roof, in case fire were to break out, what would be the fate of women and children who might be sleeping in the garrets? In such instances the staircases



Life in the Garrets.

generally become impassable in consequence of the fire and smoke, and the application of the fire-escape to the back part of the premises which the garret window overlooks would be impossible, owing to the peculiar nature of the ground, the high walls, and other impediments. A clause in the Metropolitan Building Act is supposed to regulate the height of inhabitable rooms in the roofs of houses, but it is altogether inoperative. To return, however.

A woman has been found dead in a room at Homerton, so miserable, that the jury and coroner were startled and shocked. Such events as these are becoming of almost daily occurrence. The parish refuses to give outdoor relief, and the people will not go into the house; so they die.

Still the London workhouses get filled. Some of our daily contemporaries have given valuable figures in connexion with the pauper population now in the workhouses of the metropolitan districts. It is pleasant in these notices to read accounts of the supply of roast beef and gigantic plum-puddings, on the production of which the masters of workhouses seem especially to pride themselves. In the accounts referred to, we find a report of the population of parishes; the increase as given in the last census return; and a comparison of the price of butcher's meat, bread, &c., between the years 1863 and 1864. From the latter it appears that the cost of the staff of life has been almost stationary, but that the price of butcher's meat has very largely increased.

There is, however, one particular part of this report to which we would direct especial attention, viz., the variations which have taken place in the years 1863 and 1864, in the numbers of persons that have received relief from the different parishes. This is a matter for study, inasmuch as it indicates the direction in which the poor have been driven by their removal from dwellings in certain districts which have been pulled down. There are some omissions in the newspaper report, but of the parishes mentioned ten show a decrease, in some instances very slight, in the number of persons receiving indoor and out-door relief; and eighteen parishes show an increase, in some cases to a very large extent: we give the figures as they are placed in our hand.

In the City of London Union, the total decrease of the poor receiving in-door and out-door relief is 135. In Marylebone, the decrease, compared with last year, is 141; West-London Union, 12; St. James's, Westminster, 53; St. George's, Hanover-square (no account of the numbers of the out-door poor), decrease of in-door poor, 5; St. Mary Abbot's, Kensington, decrease of poor receiving parish relief, 210; in the Strand Union the numbers remain about stationary; St. Leonard's, Shoreditch, the total decrease is 96; St. John's, Hampstead, 3; St. Mary's, Paddington, 26; Brentford Union, 36.

The increase of the poor receiving parish relief is stated to be as follows:—St. Pancras, 153; St. Martin's-in-the-Fields, 19; St. Mary's, Newington, 131; St. Mary Magdalen's, 67; Greenwich Union, 124; Whitechapel Union (in-door poor: no statement of the extent of out-door relief), 5; Stepney Union, 14; St. George the Martyr's, Southwark, 238; St. Mary's, Rotherhithe, 224; St. Margaret and St. John's, Westminster, 82; Hendon Union (in the house), 3; Holborn Union, 22; St. Mary's, Islington, 62; St. Saviour's Union, no return; Mile-end Old Town, 53; St. Mary's, Lambeth, 691; St. James's, Clerkenwell, 100; Edmonton Union, 30; East London Union, 17.

It will thus be seen that there has been an increase of pauperism to the extent of 153 in the year in the parish of St. Pancras; and in the parish of St. George the Martyr, Southwark, 238; while in St. Mary's, Lambeth, the enormous increase of *persons receiving parish relief has been* 691 in one year. This is a difference so great that the causes of distress and the particular conditions of the poor in this district require investigation.

The enormous increase of the population of London is telling on all our charitable institutions. Notwithstanding the number of hospitals, for example, there is still a cry for more. Such is the pressure at the present moment in some of them, that it is difficult to find a vacant bed, and it is too often the case that the admitted poor are discharged and sent to their unwholesome homes before they have completely recovered or gained sufficient strength. Accommodation is greatly wanted for patients who require care after they have been discharged from the general hospitals. Those who are acquainted with the working of the London hospitals know well how sadly this is needed. Even the pressure of out-door patients on the hospitals is enormous; and those who have not visited them could not fail to be surprised at the crowds of sick who throng the waiting-rooms for several hours each day, except Sundays. Very varied is the appearance of those who form the groups. There are amongst them people both old and young, hard-working artizans, costermongers and idlers, decent honest-looking persons and those who have no characters to lose, decayed tradesmen, struggling to keep up an appearance, smartly-dressed women and many in thin and tattered clothing; others of the applicants look so respectable that it would scarcely be thought they could need the aid of such establishments, and yet to many of these the charity is the most valuable. Indeed, it is to the well-conducted struggling classes that hospital aid is often of the greatest consequence,—to those who could not in fairness claim the attendance of the parish surgeon, and who are unable to pay for the visits and medicine of the private practitioner. When sickness is in the house, the usual charge to the industrious part of the community for visits and medicine is 2s. 6d. a day. This in a week amounts to 17s. 6d.,—a sum which it is almost impossible for persons of small means to pay for any length of time. If the rules be strictly carried out, the parish medical relief is granted only to persons whose income is less than 18s. a week, and it is by those who have families, whose earnings are more than the above-mentioned amount, that medical assistance is often much needed. We have met with many instances to show that there is great want in the crowded parts of the metropolis of an extensive system of free medical visitation and the supply of medicine. There is an establishment with these ends in view in Islington, the advantages of which might be greatly extended if its merits were better known. In connexion with this institution, which is situate near the parish church, persons who can obtain letters from subscribers can be attended at home, and have medicine without charge from the dispensary. In such districts as those of East London an institution of this kind would be of immense service. There are many sick persons who are so circumstanced that they cannot avail themselves of the hospitals: some are unable either to pay the cost of cab-hire or to walk to a distance; and there are numerous instances of persons needing skilful medical treatment who would not be admitted as inmates in the general hospitals. In Paris there is a good system of treatment of the sick poor: a paper is delivered to the patient, or his representative, which ensures the regular attendance of the doctor appointed to treat him, and is kept by the bed-side. On this paper the doctor is bound to record the exact time of his visit and the patient's condition, and an inspector from the *bureau* follows from time to time in his wake to see that due care has been given to the patient. The attendance on the sick poor in Paris at their own houses has been proved to be a great success, and an economy in money; the home patients costing on the average 13s. each, while every hospital-treated patient costs 2l.

Let us look in another direction, and ask for further aid for the thousands of poor children who are being brought up, or brought down, to swell the ranks of the dangerous classes. Thrown into the dirt, and without a guiding friend, they go on from bad to worse, and then society lifts its hands and wonders that there should be so many evil men and women in the world who are positively incorrigible, and go in and out of prison all their lives, as if the occurrence were merely one of the risks of their trade;—and so in fact they do regard it. "Why, Hal," says Falstaff, when reproached by the Prince with purse-taking, "'tis my vocation, Hal; 'tis no sin for a man to labour in his vocation." And so think the outcasts of our streets, the spawn of our slums.

The world does not recognise the connexion of cause and effect. Let us endeavour to illustrate it. We shall be pardoned by those referred to for the sake of the cause we have at heart,—the mighty interests that are at stake.

In the chapel of Buckingham Palace, one Thursday not long ago, amidst royal relatives, our beloved Queen assisting, and all the kingdom sympathising, an infant boy was christened Albert Victor Christian Edward. Love watches over his cot, carefulness hundred-handed protects his life, and developes his powers of mind and body. In due time competent men will conduct him to knowledge: he will be taught his duty to God, his duty to his neighbour, his duty to himself; and no one doubts that being so taught he will become an honourable, upright, and noble man, acting through life as befits his high position. Accident, strong passions, half teaching, may lead him in the heyday of youth to what calmer and more tutored spirits would know to be irregularities or excesses, but this is the merest chance; and knowing the examples this honoured child will have before his eyes, and the tutelage which awaits him, the whole country is justly confident as to the result.

On the same Thursday, too, Mrs. Henry Smith's son was christened John. Papa had a dinner-party, invested 1,000*l.* in New Threes, through the well-known brokers, Dale, Spiggot, and Dale, in Master John's name, to accumulate quietly till he should be old enough to spend it properly; and, moreover, did several generous acts marking at once his comfortable affluence and state of personal delight. In due time John will have a private tutor, perhaps go to Rugby (his mother would like to get him some fresh connexions), will adopt a profession, marry an estimable young lady, and, if not a genius or general benefactor, will most likely discharge his duties as husband, father, and citizen, at all events respectably. If he should not do so, he will be an exception to be pointed at—the one John Smith out of a thousand who, well nurtured, well taught, and well placed, yet went to the bad, and brought the law down upon him.

On that same Thursday evening, in the back two-pair of a house in Lincoln-court, Drury-lane, a well-formed, beautiful little boy was born in public—at any rate in the midst of two families. The mother is a poor dissipated wretch, whose husband had left her four months before, and who will drive the child into the streets to beg, thieve, do anything, nothing, as soon as it can go alone. If this child (should it happen to live) do not run a career of vice and crime, and be the cause of expense and sorrow to the community, it, too, will be an exception in its class.

To educate is better than to punish. Prevention is better than cure. The neglected children of the streets should be made the property of the State.

THE GENTLEMAN'S HOUSE.*

IN an article on House-Planning, in our last volume, wherein were noticed one book that endeavoured to deal with the general subject, and another that treated of cottages, we adverted to the fact that "houses are productive of good or bad influences in conformity with the manner of their *planning*," and went on to remark that there was then need of a perspicuous statement, "both didactically and for after-reference," of the points that ought to be considered in that branch of the process of architects' design. The still wider subject of iconographic distribution, and in its relation with the scenographic, or the production of *delight*, no less than with the attainment of *commodity* and *firmness*, is still left to the commendation in lectures at the Royal Academy, of it, as a study, and to the exercises resulting in those arrangements of plan, sometimes called academic, wherein the satisfying of material wants, and the conditions of actual sites, are little recognised,—educational methods which may be considered to have their chief representation in the École des Beaux Arts. But something has at length been done towards exposition of the whole subject, and by a book that goes far to supplying the want that we originally referred to.

Mr. Kerr's volume, by the scheme and manner of its treatment, may be said to comprise but one portion of what is architectural design, but one of planning, and the planning of but one division of the class of buildings included under the head of habitations; but the scheme itself is worked out in a manner that may be called nearly exhaustive of principles and of detail for purposes of information and reference, and at the same time suggestive of those lines of further thought and study that belong to the vocation of the individual architect in the particular house upon which he may be engaged. It is a book eminently designed for those who will read thinkingly,—that class of progressionists,

* "The Gentleman's House; or, How to Plan English Residences, from the Parsonage to the Palace; with Tables of Accommodation and Cost, and a Series of selected Plans. By Robert Kerr, F.R.I.B.A., Architect, Professor of the Arts of Construction in King's College, London. London: John Murray, Albemarle-street. 1864." 8vo.; pp. xxiv & 484; 44 plates & 20 cuts.

always ready to be searchers,—to carry on the "increasing purpose" from, and therefore after the ascertainment of, what there may be already of basis of legitimate precept and recorded fact,—the only readers by whom an author who has expended great pains can be appreciated, and the only public, perhaps, that he should care to address. Thus taken, the book will be found to suggest much in the matter of planning of dwellings below the class of "the gentleman's house," in that of all buildings for habitation, whether of the residents in towns generally, or in suburban and agricultural districts, and in those suited to the condition of the sections of the community generally included under the "lower middle" and "labouring" classes. By the exposition afforded of the requisites of the superior sort of house, also it may conduce to an ultimate great advance in the art division of the architecture,—in art-architectural, wherewith Mr. Kerr, in his early exertions, occupied himself chiefly.

In this age of hurry, whilst abundance, whoever sets himself to ascertain, and who records, what has been discovered, is a benefactor in his field, and beyond it. He prevents that repetition of working out the same problems, that wastes the time of those who labour, but do not record; waste which, we apprehend, has characterized our profession, when compared with other professions,—that of the civil engineer as one,—and which still distinguishes the pursuit of architecture in this country from the practice of the profession abroad. Whether in France, Germany, or America, there seems to be a constituency of purchasers and readers of books on architecture or building, sufficient to justify publication of such works to a larger extent than in Great Britain. In Paris there are several shops entirely devoted to the publication and sale of books on architecture and engineering; in London there is hard work in maintaining one depôt of the kind. There have been those acquainted with the publishing trade, who have declared that architects were neither buyers nor students of books. If they are not the latter, they are in error. We marvel that no enterprising person has had his eye upon the ground-floor of the Architectural Union Company's premises in Conduit-street, to establish there a place of sale for English and foreign architectural works, including photographs. The book now before us, we are glad to hear, has had an exceptional sale.

Mr. Kerr carries into effect the purpose of his treatise chiefly by an exposition of the arrangements and details required for the plan of a "Gentleman's House;" but he also enters into the history of the subject, and gives many examples; and he treats of site and cost, and of style as connected with plan. Prefixed to the body of the work is an elaborate "Index," or *Table des Matières;* respecting which we have to say, that had our author published nothing else under the title of his book, he would have deserved well of the profession and the public. The scheme in fact, of the book, constitutes much of its merit, or adds thereto. The actual arrangement in parts, divisions, sections, and short chapters, has helped to swell out the volume considerably; but it certainly assists the comprehension of the ordinary reader and the professional student. Not only the architect, but one who has had occasion to consider his own occupation of a house or a room, that is to say every one, may find in the work much that he is perfectly familiar with; and this circumstance perhaps gives an impression of diffuseness or repetition; but we should not have been disposed to omit much of what the author has set down. Indeed he has made some omissions. In particular, he does not make sufficiently clear to a non-professional reader, that planning, as of a "gentleman's house" or other building, includes much more than this book could teach. As to staircases, flues and smoke-conduction, drainage, and some other items, we might have desired a more pointed allusion to the minute attention which they require, to prevent the notion of a single *plan* drawing being sufficient, or without sections, to show what the architect had to design. Staircase-planning, the subject of distinct works by other authors, must be considered as quite inadequately treated; though we note, with approval, the remarks on the inconvenience of winders. The value of the book would have been enhanced by reference to works on the separate subjects, as on stables. Where the author does name in the text, an authority, as Parker, he should have quoted the title of the book at length. The authorities for the plans given, are quoted. Mr. Kerr has added to many of these plans, "suggestions" of his own, as on the original occupation of many of the rooms. More precise reference than he gives in some of the cases, however, would be needed, seeing that what he characterizes as a defect, might turn out to be different, were there the complete illustration of the building. Even in the case of Somerleyton, a badly-arranged house, where the windows of the drawing-room open into the conservatory, the one plan does not suffice for our seeing that there are no other windows: we dare say, the case is as bad as the author puts it; and he cannot be far wrong in saying that the room "could not possibly be wholesome;" but there might be windows in the upper part of the room above the level of the conservatory-roof, and there might even be arrangements for admission of fresh air in the lower part of the room. We have so often had to say to committees that one drawing of a set, as a plan, is but like one of the parts of speech in a sentence, that we must not allow any present possible inference to the contrary; particularly as we do not gather that our author has described in all cases, with advantage of actual observation of the buildings. Amongst the omissions is that, in some of the plans, of an indication of the points of the compass, given clearly enough in others, and important for all, seeing that aspect has occupied much of Mr. Kerr's attention. But when we have said that reference to plates, in the body of a work, should give their pages, and directions to binder be added, we have mentioned all the omissions that here call for notice.

The matter of the volume is divided into six parts, which are headed,—"A Sketch of the History and Development of Domestic Plans in England," "Exposition of Plan as now practised," "Notes on Site and the Grounds," "Notes on Architectural Style," "Notes on Accommodation and Cost," and "Critical Notes on the Plates." The last part, "or Appendix," is connected with both the historical and expository portions of the book; though of the forty-four plates, the first twenty-two are given more especially for the history of plan. They include, in chronological order, Castleton Castle, and the White Tower, London, each of the eleventh century; Castle Acre Priory, twelfth century, and Castle Rising Castle, of about the same date; Charney Bassett Grange, thirteenth century; Kenilworth Castle, fourteenth; Wolterton Manor House, and Oxburgh Hall, fifteenth; Hengrave Hall, and Hatfield House, sixteenth; Inigo Jones's Ambresbury, and Stoke Park, seventeenth; Marlborough House, Blenheim, and Holkham Hall, commencement of the eighteenth; and Longleat, of the sixteenth century, as modified by Sir J. Wyattville in 1809, and Toddington, 1819; whilst to these are added, in seven plates, four expositions of contrast in later planning between what the author regards as Classic or Palladian, and what he considers Mediæval. In five plates, to the fourth part, which is on style, he gives ten sketches, to one plan, of as many different styles, all now having, or having recently, had favour shown them.

The first part of the volume is merely divided into chapters, chiefly of the centuries from the eleventh to the nineteenth inclusive. But the second part, or "Exposition of Plan as now practised," gives a classification into "the Family Apartments," "State Rooms, &c.," "the Domestic Offices," and "the Stabling and Farm Offices, &c." The first division of these four is sub-divided into sections, as "General Considerations," "the Day Rooms," "the Sleeping Rooms," "the Children's Rooms," "the Supplementaries," and "the Thoroughfares;" and the third division similarly into sections, which include "General Considerations," "the Kitchen Offices," "the Upper Servants' Offices," "the Lower Servants' Offices," "the Laundry Offices," "the Bakery and Brewery Offices," "Cellars, Storage, and Outhouses," "the Servants' Private Rooms," and "Thoroughfares, Supplementaries, and General Arrangement." The part which gives the "Notes on Site and the Grounds" is divided into sections headed "the Choice of Locality," "the Choice of Site," and "the Arrangement of the Grounds and Adjuncts." But each of the other parts, and the sections of the divisions of the parts which we have named, are divided into many chapters. In some of these, guiding principles are discussed; and in others, the requisites of the separate rooms are described. The plans are drawn to one scale.

Although the question of style of decorative architecture has one part of the volume devoted to it, that branch of the extended subject of "the gentleman's house" does not make any large portion of the whole. The discussion of two opposite systems of plan, the Mediæval and the Classic, as the author designates them, however, is frequently entered upon; and there may be those who would find fault with Mr. Kerr for the surrender of a preference that has been ascribed to him. Indeed he has, we think, allowed it to appear that he has a greater preference for the Mediæval arrangements than he feels. The truth is that there was a regular progression from the commencement of the period embraced by his historic sketch, down to the seventeenth century, in the arrangements for convenience and the several objects of good planning, and that in the latter period plans were adopted rather with a view to the production of decorative features, imitated from those of architecture on the Italian soil, than to that of convenience and to the English climate. The question is, how far regularity of the Classic plan, with the symmetry of corresponding halves, which looks well on paper, may not be made to serve directly convenience; and indeed how far some concession even, though a slight one, of convenience to effect, would not be defensible. There is a decorative treatment which can serve convenience. It is evident that the symmetrical arrangement assists persons in finding and remembering routes from point to point; and the advantage of this seems to be recognised by our author. There remains, however, the fact that the progression which had continued up to the time of the Tudor and Elizabethan buildings, and had at last supplied corridors as passage-way,—instead of continuing to make use of rooms, or of the open air,—was stopped by the foreign importation, to be resumed only in this present century; so that the preference is that which an architect should have for what is matter of the use of a building. Buildings on the one system may be made decoratively good: certainly those sacrificing convenience cannot belong to good architecture. Mr. Kerr gives the plan of Marlborough House as an illustration of the system wherein convenience was sacrificed to symmetry, and suggests an amusing inquiry as to the route that would have to be taken by the dinner in passing from the kitchen to the place where it might be eaten. He says,—

"Now the Kitchen is on the ground-level. The Dining-room is on the ground-level also. But to carry the dinner across the Entrance Court and in at the front door (see the plan) would never do. To carry it round by the garden and in at the saloon-door would never do. We might contrive a third route, thus: along the colonnade, in at the library window (or sash-door rather), and so through the rooms and main thoroughfares; but this, although the best that could really be accomplished on the ground-level, is still a jest. The actual route was this: first down-stairs to the basement; secondly, through the basement Corridors (probably dark as Palladian basement Corridors generally were); thirdly, up-stairs again by any one of three equally awkward means; and, fourthly, so on to the Dining-room in a manner (whichever of the three stairs might be preferred) still as awkward as the rest. And why all this inconvenience? Merely, it would seem, because the idea fixed itself on the architect's mind that the Kitchen would make a good wing. That the Kitchen must form an obtrusive and pretentious sham two-story house, with a sham reflection opposite, was no matter; that its windows must look out upon the Entrance Court, and that it must actually have a door opening into the Court (under a sham Loggia), were acceptable conditions; that the unhappy footmen, for a hundred years or more, must stumble downstairs and upstairs, and through infinite tortuosities besides, with their soup-tureens and barons of beef, was not to be helped; let the kitchen be a wing, and it was a wing. Such was Palladian plan."

As an example of block-plan, he thinks Marlborough House exquisitely good, and that the artistic hand of Wren it is which is therein seen; but he says, such merit or "paper-deep beauty" may prove to be itself a fault.

The making convenience secondary to symmetry, or to an idea of effect, led to faults in other plans which Mr. Kerr gives. The Mansion House would have afforded him an excellent illustration. There, there was originally a central open-court, as there is still above the ground-floor; and the way to the Egyptian Hall was across this court, with exposure to the weather, or through the state-rooms at the sides. Mr. Kerr however speaks favourably of some modern plans, which seem to be imitative of Mediæval arrangements rather than designed to meet convenience. One of these has an "irregularity of the thoroughfare lines" which we cannot consider with him as "especially interesting and ingenious," and reproduces the arrangement on plan of the Mediæval hall, in a manner in which there is more of mere imitation than of the art and planning which the author desiderates.

In his opening chapter of the book, Mr. Kerr observes that each nation possesses its own pecu-

liar model of plan; and the villa of Italy, the *château* of France, and the country-seat of England differ from each other just as their owners differ in habits of life. The entire recognition of this fact might perhaps have led him to give a higher place than he has to French plan, of which he has one example. The "test of progress in domestic buildings throughout Europe," he says, is greatly "involved in the question how far any particular nation has set aside the academical Palladian manner in favour of something more properly its own." The development of the English system is the course of advancement "from the *Hall* of the Saxon Thane to the *Mansion* of the modern gentleman."

The Saxon house of what Mr. Kerr calls "average degree" was mainly, a single large apartment, the Hall, which became the great feature in houses throughout the Mediæval period. As a covered inclosure, it was the opposite of the Roman atrium. The one room served for dwelling, cooking and eating, and sleeping in, for lord and lady, guests, serfs, and hounds. There was, however, under the same roof, another place called a *Cellar*, used for storage of provisions and beer; and this may have formed a basement-story; and there was an apartment in the dwellings of the better class, known as the *Chamber*, entered probably by an outer door. In royal abodes, there would be rather more accommodation, which would include a kitchen, a detached building. After the Norman conquest there were two descriptions of building, the house of the *Hall* and *Chamber*, for the husbandman; and the "gentleman's house," which was the castle.

In the twelfth century, the author finds a certain progression evidenced in a monastic building, Castle Acre Priory. There were manor-houses which were occupied occasionally by the great land-owners, who generally dwelt in castles, but were obliged themselves to consume the produce of their estates. The monasteries had their granges. The ordinary houses of the country were of the same description. A manor-house of the day appears to have contained a hall; a chamber, or private room, called *solar;* a kitchen; a larder; a *sewery*, or buttery and pantry; and the "cellar" for stores. The "cellar" and hall seem to have been on the ground level; but the former was only half the height of the latter, and had the *solar* over it. The "cellar" and *solar* were at one end of the hall,—the entrance to the hall being at the other: both were entered from the outside. The larder and *sewery* were placed in an attached building at the entrance-end of the hall, where was also a passage to the kitchen, which was removed to a little distance to avoid risk of fire. A porch to the entrance, and a back-door to a court-yard in which were the stables and outbuildings, were amongst the other features of the plan. The king's houses possessed a chapel, which was used for business as well as worship. Generally they seem to have had but one "chamber." But, the twelfth century manor-houses included or shadowed forth some of the leading features of plan of the best-known buildings of the succeeding periods.

In the thirteenth century, in the reign of Henry III. numerous licences for the fortification of manor-houses were given; and this fact is taken to show that even the owners of castles were beginning to prefer the other sort of habitation. The group of the hall, chamber or *solar*, kitchen, *sewery*, larder, and "cellar," with perhaps a chapel, was added to or altered thus. The *sewery*, or general service-room, was amplified and divided into the "buttery" or butler's store with wine and beer cellars, and the pantry, or bread, butter, and cheese store, and the chandlery. A distinct room called the *wardrobe* seems to have been substituted for the use of chests. Other chambers were added to the principal one, though the hall was the general dormitory. Screens are spoken of as in the royal chamber, and placed between the door and the bed, thus leading the way to the future introduction of separate bed-rooms.

As the manor-house came to be more and more preferred to the gloomy and incommodious donjon-keep of the castle, as a residence, the keep was even left to decay; and a complete manor-house was erected in the inner bailey, the wall of which formed one side of the buildings. In the time of Edward I. we have the well-known castles that are called after him. The plan was the old Norman keep amplified into a citadel, or a court fortified by a wall and towers, and surrounded by an outer line of circumvallation, or several lines. The central enclosure was then occupied by a complete manor-house. In the houses of this thirteenth century, thoroughfares through rooms, even through the private chamber of the sovereign, were common. Fireplaces were few in number, and the hall was still warmed by a fire in the centre.

In the fourteenth century, a step is considered to have been made towards securing domestic privacy, although the chamber had been added previously. The provision made was that of a "priest's chamber," which Mr. Kerr describes as "the first properly private apartment in an Englishman's house,"—the chamber of the lord even, at the commencement of the century, being "but a species of Family Parlour and bedroom, withdrawn from the turmoil of the "great house-place," and the Lady's Chamber "generally a luxury to come." But offices were added, and arrangement was improved. The hall was now perfected. The chapel was placed near the dais. It was sometimes of two stories. The chamber, parlour, or *solar*, became the withdrawing-room; inside-stairs generally were substituted for the external; and rooms were set apart as bedchambers, though not to the exclusion of use of the sitting-rooms also for sleeping in. Our author however concludes that "the art of convenient disposition" of apartments was "not keeping pace with the increase of accommodation," but adds that that "we could readily believe in any case." The difficulty of planning must necessarily increase with the number of apartments for separate purposes, and with the extension at the same time of the total area. Mr. Kerr gives the plan of Kenilworth, as illustrative of the fourteenth century additions, on the model of the manor-house, to the inner bailey of a Norman keep.

In the following period, important effects upon domestic plan, from the events which make the fifteenth century remarkable, and from the improved social condition of England, are noticeable. The hall, having much of its original purpose lost, was reduced, whilst existing features were retained; but the bay-window was added. The plan of Wolterton Manor House is a good example of this period. A gate-house, originally flanked by out-buildings, leads to a forecourt space to the main range of buildings, of which last the central feature is the porch to the hall. In the plan of Oxburgh Hall, the several apartments are grouped together surrounding a square court,—the entrance gateway, and the hall with its porch, being in the same relative positions as in the former case. In neither of these examples are there continuous corridors: in the latter case, there are a large number of external doors towards the court; and in both plans, internal doors of communication between rooms are substituted for corridors.

But, for the sixteenth century, the plan of Hengrave Hall would seem to supply the needed features, or unless its corridors be additions. They surround the square court; the main entrance and the hall being still in the same relative positions as before, but the latter not having any porch. In the case of Oxburgh, there had been a carriage-throughfare through the gateway, and crossing the quadrangle, to the porch of the hall; but in that of Hengrave, the quadrangle is only an area for light, the hall being reached by the corridors. The offices form a separate wing, attached at one corner to the general quadrangular group of the domestic apartments which surround the court. In the time of Elizabeth the hall either disappeared, or an inferior sort of hall was provided for the servants. The provision of a separate dining-room for the family, the increased importance of the Withdrawing Room, and the number of the Bedrooms, are some of the items by which progress is marked; and in Hengrave Hall there are 120 separate apartments catalogued, including all that would be required at the present day. Mr. Kerr says:—

"Hitherto the multiplication of apartments had produced, besides the requisite doors of intercommunication between rooms, first an increased number of external doors, and secondly the addition of internal passages (although not many of these), narrow, defectively lighted, and tortuous. Now, however, although such doors and passages still remained in general use, yet in the better class of houses it was only in inferior parts; and the chief thoroughfares were made in the novel form of Corridors. That peculiar feature of Elizabethan plan, the "Gallery," was also introduced, some examples being not only important in respect of size, but almost magnificent in design. The staircase also became much amplified and elaborated."

The plan of Hatfield House is given as perhaps the most characteristic of the final Elizabethan manner. The plan is perfectly symmetrical. The most distinctive feature is the gallery which extends along the line of the recessed front, for more than the whole length between the wings, and supplies the place of an entrance-hall; though the entrance directly into the middle of a side of the gallery, involves some waste of effect.

In the seventeenth century, the revived Classic style of architecture was brought into England by Inigo Jones; and, says Mr. Kerr, there appears to be "no reason to believe that any other than Jones introduced Italian plan." He continues:—

"Nothing could be more decidedly a revolution than the change which now took place in the arrangement of an English Gentleman's House. In a word, the old English model was made obsolete, and a new Mansion, to be in the fashion, must be an Italian Villa, copied out of Palladio's book, reason or none. Under the Mediæval system, including the practice of the Tudor period, we see a large variety of apartments gradually grouped together, without much regularity of disposition; the chief Dwelling-rooms and the Offices forming the ground-story (as in Hengrave, rather than Hatfield); and the Sleeping-rooms, with some others exceptionally, constituting one floor above, or in occasional instances two. The new mode, on the contrary, as a rule, elevated the house upon a complete Basement, composed of the whole of the Offices, the Principal floor constituting the Family Dwelling-rooms, and one story above accommodating the Bedchambers. In the matter of stateliness of design, the utmost endeavours of the Tudor time had been limited to an elaborated Porch at the Hall-entrance; a resuscitation in the Hall itself, in the form of some meretricious ornament, of a little of that dignity which in all besides it had lost; and a corresponding magnificence, quaint rather than imposing, in the new Galleries and Staircases, which had been copied, perhaps we may say, from the French. But now the old Mediæval Hall was entirely surrendered; upon quite another principle there was formed a central Saloon (a modification of the open Cortile of the larger Palazzi, adapted to the Villa, or Country-seat, in Italy), reaching in height to the roof of the building, lighted from above, and surrounded by the apartments generally; instead of the comparatively trifling Elizabethan Porch, there was a majestic Portico of columns, with a broad ascent of steps; other entrances from the various quarters were disposed with little regard to economy of space, but with a constant study of imposing symmetrical effect; and, whether the design was on a large scale or a small, there was no longer any toleration of irregularity or picturesqueness or any other unstudied grace, but the whole building must be massed into an imposing composition, beside which the rambling old Elizabethan mansion was in a manner dwarfed, while at the same time it must be confessed, that beside the Elizabethan mansion the new Villa too often might have been charged with seeming more like some temple of the gods than the home of an English family."

Comparing the plans of Stoke Park, and Ambresbury with those previously considered, no contrast could be more complete.

"The change is not one of details or of parts, but of radical elements. Hall and Chamber, Parlour and Bower, Quadrangle and Gallery, are all gone: and in their place there are to be the great Saloon of Italy, the Portico and Colonnade; these for display; and for dwelling-rooms a series of symmetrical compartments into which the bulk of the house is divided at haphazard, to be appropriated at discretion." . . . . . "In short, we may almost say that the sense of grandeur was the first consideration, and the proprieties of convenience and comfort decidedly the second."

In the eighteenth century, the same system was continued. If the offices were not on the basement, there was some form of cellarage as an under-story; and a pair, or even two pairs, of wings were attached to the main building, to accommodate the offices. The great central apartment, the Saloon of early Palladianism, became in name at least the hall, the "saloon" being a compartment immediately in the rear, the centre of a suite of drawing-rooms, but having a garden-door and a portico. The communications were defective; and thoroughfare-rooms again came into use. In some of the requisites of plan, compactness perhaps excepted, there had been no progress, whilst in certain respects there had been even retrogression. But there was much done towards the completion and organization, says Mr. Kerr, of "that catalogue of rooms which constitute a modern Gentleman's House;" and of course he does not omit to recognize the "pictorial magnificence" of Blenheim, and the "dignity" of Holkham, arising from its plan,—adding even that "so much is this the rule throughout the whole period, that it is questionable whether in this respect the best works of the eighteenth century have ever been equalled in the nineteenth."

To the produce of this nineteenth century we shall next give attention.

INDUSTRIAL EXHIBITION AT THE POTTERIES.—We are very glad to hear it is proposed that an exhibition of the productions of the workmen in that district shall be held. Arrangements have been so far made that it is considered probable that the exhibition will be held in the month of April. Individuals will thus be enabled to show what they can do.

TOWN SEWAGE AS GUANO.

In considering the sewage question people have, perhaps, not attached sufficient importance to the enormous consumption of guano and artificial manures generally, as an indication of the form in which it would be most useful. The secret of this successful sale and large use lies, in one word, in the portability of the article. Guano and most artificial manures are dry powders, easy to pack in bags, easily conveyed from place to place, and easily laid upon the land. Indeed, the last-mentioned process is performed with as little labour as the sowing of seed broadcast. A man takes as much as he can carry in an apron before him, and, stepping out with long strides, scatters it in handfuls as he paces up and down the land. While it is yet time, we may open the question as to the practicability and advisability of manufacturing town sewage into similar dry, powdery, guano-like compositions.

Phospho-Peruvian guano sells for 11*l.* per ton. Its competitor, phospho-ammoniacal guano, sells for 9*l.* 10*s.* per ton. The component parts of these manures are identical, the difference in the value being determined by the respective quantities of those parts; the Peruvian guano containing more than double the quantity of organic matter held in the latter. Next on the list stands bone meal in esteem: this is sold at 8*l.* 10*s.* per ton; half-inch, or dust and drill bone, realizing 10*s.* per ton less. Superphosphate of lime, in which the insoluble phosphate is guaranteed to be pure raw bone, fetches 7*l.* per ton; dissolved bones and superphosphate of bones, 7*l.* 10*s.* and 6*l.* 10*s.* respectively. Concentrated acid costs 10*l.* per ton. These prices place figures before the eye which render it difficult to believe but that the converting of sewage into a portable commodity would be a profitable proceeding.

Happily it is no longer a question whether we shall waste our sewage or not. That is settled. All that is now required of us is to insure its most economical and remunerative management. We do not refer particularly to the London sewage, because this exceptionally enormous quantity may call for, and pay for, especial treatment. Nevertheless, the remarks we are about to make are equally applicable to the metropolitan sewage as to any other. Of the places where utilisation has been attempted, Coventry has approached the nearest to a manufacturing process. At Croydon, Carlisle, Edinburgh, and Rugby, the irriguous portions of the sewage are dealt with; but here the fluid parts are suffered to discharge themselves into the river, and the solid residue is regarded as the valuable part of the matter. This is, as we have elsewhere stated, mixed with all the scavenage of the town, till it assumes the character of a thick pulp, when it is shovelled into the carts of the purchasers. And here the Coventry people stop. The objection to the present stage or development of this plan is the sloppy weight of the commodity and its unsuitability for conveyance.

It would be well to inquire, of what are the manures composed that at present monopolise the market? Phospho-Peruvian guano and ammoniacal guano contain unequal proportions of water, organic matter, soluble phosphates, insoluble phosphates, sulphate of lime, alkaline salts, sulphuric acid, and sand. Dissolved bones contain, according to Professor Penny's analysis, precisely the same component parts as these, only in different proportions, the sulphate of lime predominating. Superphosphate of lime, recommended by Liebig to be added to all sewage before use, contains less organic matter and more sulphate of lime than either of the manures mentioned. We should not shut our eyes to the fact that town sewage is rich in organic matter, the very large quantity of which held in guano is the cause of its extra value.

After centuries of waste of sewage, we cannot expect to grasp the right mode of dealing with it without a wrong guess or two at first. We must look at the subject from every point of view, and keep the fact that we have by no means arrived at a perfect system always before our eyes. The irriguous processes limit the use of the sewage to the lands in the neighbourhood of the town in which it is accumulated; and as these cannot be under irrigation all the year round, there must be waste in this plan. In the mode adopted at Coventry, the watery particles are drained off, and avowedly disposed of by discharge into a river: here, although it is contended that this fluid is useless, must be more waste. There should be none whatever. The golden axiom, "waste not, want not," applies to sewage as well as to everything else. If rendered portable, the sphere of its usefulness would be so much extended that the supply could not exceed the demand. That anything capable of increasing the yield of field crops should be thrown to the dogs, or to the fishes, is as extravagant a proceeding as throwing bread into a pig-tub. Not only some, but all of the sewage should be turned to good account; with precisely the same frugality as that which directs the good housewife to require that not a crust of bread should be wasted. And whether we can ensure this economical utilization without its intermediate manufacture into cakes or coarse powder, is a matter for consideration. Dealers in manures regard the full consumption of town sewage on lands as a hopeless business till it is rendered portable, and so vendible.

It will be observed that all the manures now engrossing the markets contain sand, or insoluble silicious matter, as it is somewhat grandilquously called. Sewage would require a similar arenaceous stamina, or ingredient, calculated to solidify it. Although we do not compass to dictate details, we may suggest that it is in some such sufficient manner as that with which some of the difficulties attending the formation of the Metropolitan Main Drainage were grappled, that the present design should be undertaken. When a large quantity of gravel was required for concrete, the contractor purchased several acres of ground close by, and there and then dug out the requisite in question: in another place he ran out a pier for the landing of lime; and laid down several railways for the conveyance of his materials. The consolidation of sewage would call for similar ready, comprehensive, wholesale measures. Steam-power and the regular organization of a manufactory should be brought to bear.

Dublin and Birmingham are on the eve of an installation of improved economy in the disposal of their sewage. Would it not be a wise investment to spend a few pounds in experiments before a final, and, perhaps, second-rate, step be taken? If a private firm possessed a raw material that appeared likely to yield a remunerative profit by the application of a manufacturing process, we question whether there would be two opinions as to the advisableness of a test. And, again, if guano, or dissolved bones, or superphosphate of lime, were only applicable to certain contracted areas of land within the radii of a certain number of hose, we doubt whether there would be the large sale there is now for both.

The greatest difficulty there would be to contend against would be the ceaseless, cataract-like flow of the sewage. Taking one hint from a successful experiment, and another from a failure, we might combat this. It has been found that sewage collected in tanks for irrigation leaves a deposit of a thick pulp-like consistency, which every now and then has to be removed. In one case—mentioned in our survey of towns—this pulp is wastefully carted away or thrown into the river, so as to leave the tank free for the more watery portions. In another instance, also detailed in our survey, when one tank is full the flow of sewage is diverted to another, and the contents permitted to harden. Thus, we are assured, that whether it is wanted or not, there is a tendency on the part of sewage to consolidate itself. We might assist this tendency. Perhaps if the stream, instead of falling into a brick or stone tank, precipitated itself into a bed of highly-absorbent matter, we should gain the desired end. If we suggested lime as an absorbent, we would, of course, be reminded of the failure at Leicester. There are, however, other absorbents which might be mixed with this,—such as sand, saw-dust, loam, &c. Arrived, by these additions, at the consistency of guano, the same process that pulverizes the one could be applied to the other.

In reply to those who advocate the use of sewage in a "slop" state, we admit that as a manure, it is at certain times of the year as useful in that form as in any other; but as an article of sale it is so confined to a limited locality that it is comparatively valueless. It would certainly not pay to convey trucks of slosh by rail. Converted, however, by additions and by processes, into a dry powder or concentrated essence, the cost of carriage would be trifling; and the expence of conveyance removed, the most inaccessible outlying lands can be benefited, as well as those lying along the line of communication.

There is, and always must be, an enormous market for manures. The owner of the smallest bit of back garden, or allotment, as well as the farmer who tills his hundreds of acres, knows that the land is no good to him without manure. It must be had. The small gardener or working man, with an allotment, turns to the pig as the fertilizer of his soil now that the new town sewerage conveys all the sewage into the river; and, accordingly, knocks up a pigstye as close to his back door as he can find room for it, thus creating a new sanitary evil. This he contends is the cheapest manure he can get, because he can feed the pig nearly for nothing upon the garden produce, and then sell it after it is fat; so he takes no account of the sickening smells emitted in the boiling of the garden and table refuse that forms the pig's diet, nor of those emanating from the sty. Now, if the town sewage were rendered concentrated and portable, either in a cake or powder, much of the pig-keeping nuisance would be done away with, and one source of disease and discomfort removed. It is, however, in its great bearing as a national question of economy that we now look at the question. It appears not unlikely that if we are to get the full value of our sewage we must pulverize it.

This mode of dealing with the sewage would by no means interfere with works already laid down. For, alluding, now, to that of London, it would be difficult to get a less objectionable place for the establishment of a vast manufactory than the dreary unpopulated place near Barking, where the sewers disgorge their contents. Or, treating only of country-town, or city refuse, the present outlets all indicate the sites suitable for future manufactories.

The vast consumption of guano and artificial manures points distinctly to the fact that portability is a matter of the first consequence. Their component parts tally in kind, though not in quantities, with those of sewage; for what is there that is not to be found in sewage, even unto bones and dyes? And then, again, the earth's stock of guano cannot last for ever, albeit it has been accumulating for thousands of years; consequently, the price will have a tendency to rise instead of fall. It behoves us, therefore, to manufacture an article that will answer the same purpose. How to do it at a cost that will make it pay and produce no injury is the question.

"BLOCK-SINKING;" OR, BRICK-AND-MORTAR REMINISCENCES IN THE EAST.

DURING a roving tour in Northern India, some years ago, undertaken for the combined purpose of seeing a little more of the world, and escaping the much-dreaded rigours of an English winter, I happened to visit, on my way to the "Hills,"—that Paradise of Anglo-Indians,—a somewhat dull but profoundly philosophical little station far away in the north-west (shame on me for forgetting the name of it!), and thus became acquainted with the particulars of some very important engineering works going on in the immediate neighbourhood. Though but in an embryonic stage of existence when I saw them, these brick-and-mortar performances were so different from anything of the kind I had seen before in my wanderings about the world, and the circumstances connected with them so particularly interesting, that I shall endeavour to give the reader—not already over-primed on the subject, it is hoped—a brief account of what I saw on that occasion; and again on another one some years afterwards, when on a flying visit to the Western Presidency, that steaming, suffocating, odoriferous haven-of-bliss for "land reclamation companies (limited)," and money-making Parsees, unlimited.

The noble art of block-sinking is brought into play, it seems, for constructing the foundations of buildings, under circumstances which, in other and more civilized parts of the universe, would necessitate a recourse to pile-driving, or some wonderful mechanical arrangement involving the use of steam-power, and which, as far as the latter are concerned, would be wholly unsuited to such an out-of-the-way part of the world as that secluded name-forgotten abode of the brick-and-mortar art so especially was in those days of yore. Complicated machinery of any sort would be sure to go wrong in the hands of the unsophisticated Hindoo, and then everything would be at a stand-still for want of the necessary means to repair damages. So, for matters to go on smoothly and uninterruptedly in that part of the country, simplicity, I was easily convinced, must clearly be the order of the day. As an instance of native genius for misunderstanding the use of common things

beyond their ken, it may be mentioned that a friend of mine had indulged in the luxury of very ordinary brass locks for his bungalow-doors; and sure enough every one of them became quite useless before long; and, in many cases, the handles wrenched off in trying to do what any one of our own blessed infants acquires a knowledge of as soon as it is old enough to reach the much-coveted object.

The works that came under my observation, and on which swarms of natives were working away as busy as bees—though such instinctive industry is by no means a remarkable attribute of that interesting people—were the foundations of a gigantic aqueduct, compared with which all other conduits of water, ancient and modern, were verily not to be mentioned in the same breath; in short, nothing like it on the planet. Operations were being carried on in the bed of a river of some considerable width, as dry as the table I am writing at for several consecutive months in the year; and during the rainy season the scene occasionally of such very heavy torrents, that it was difficult for uninitiated man to conceive by what scientific means anything could be constructed to withstand their violence; especially when it is known that the integrity of the river bed, consisting of sand and water of unknown depth, can be only permanently secured by the most consummate skill and good management; failing which, it would be scooped out here, there, and everywhere, and every blessed thing along with it.

The difficulty of laying in the foundations of a work 20 ft. deep by any other process than the one to hand can be easily understood, from the fact of the perennial spring water lying so near the surface that it was utterly impracticable digging down more than 5 ft. or 6 ft. in the usual way, and that by no means an easy matter. It is true that the means employed for overcoming a difficulty of this nature are extremely simple, and, after all, but an improvement on the plan that has been in use by the natives of India from time immemorial; but it is on this very account they are so well worthy of notice, as not only being admirably adapted to the comprehension of the Asiatic and the undeveloped resources of his charming but very tepid part of the globe, but also as being so desirable of introduction elsewhere.

It may be stated, in a few words, that the native method of obtaining foundations for their bridges and such-like, is sinking a number of brick cylinders,—or "wells," as they are generally called, I believe,—which are afterwards filled in with earth or concrete, domed over, connected together, and built upon as they best may. In the work that I am presuming to scribble about, the choice was said to lie between pile-driving and "blocks," the relative merits of which, and the reasons of preferring the latter to the former, though duly impressed upon my bewildered mind at the time, is really much too serious and recondite a matter to take in hand just at this moment—much to the reader's satisfaction, no doubt.

The advantages of rectangular blocks over circular wells, to build upon, are far too manifest, one would think, to need any special disquisition on that head, substantiality and their adaptation to the form of superstructure being not the least important of them; and yet these wells have since been extensively used on some important works now in progress in another part of the country, which will be noticed hereafter. In regard to the system adopted on this occasion, the style of procedure appeared to be as follows. After divers optical feats had been performed with level and theodolite, to fix with mathematical accuracy the position of piers and abutments, operations were commenced by clearing away as much of the sand as the walls below would admit of, and this appeared to be about 2 ft. or so below the surface of the river bed, a damp, uncomfortable-looking place being now exposed to view. The next part of the business was to lay down enormously-massive timber frames, consisting of roughly-squared trunks of common jungle trees, firmly fitted and bolted together, all arranged in apple-pie order for the walls of the blocks which were to be built upon them.

To make the matter sufficiently intelligible, and speak in round numbers—though very near the mark—we will assume the foundations for one of the piers to be 200 ft. long, 20 ft. wide, and 20 ft. deep; this would consist of nine cubes of 20 ft., placed between 2 ft. and 3 ft. apart, and which are built up first of all to a height of 12 ft. The walls of each block are so constructed as to form four cavities, or "wells," as they are called, 6 ft. square, for the convenience of getting out the sand, as will be seen further on. Common trestle windlasses are next placed on the top of the blocks, one over each well, and strong wooden troughs laid in a slanting position against the walls, to perform the twofold office of an inclined plane for the workpeople to go up and down upon, and a slide for the sand that is to be scooped up from the bowels of the earth.

Coincident with the later operations is the very important one of digging away the sand as deep as can be managed from a distance of 20 ft. or 30 ft., parallel to the lines of blocks; for the sand not so excavated, be it known, would, in the course of undersinking (as the operation is called) find its way into the wells, which, for obvious reasons, would be a much more troublesome and expensive way of getting rid of it than by digging after the usual manner of mortals. Each of the windlasses is provided with a large ponderous iron spade, scoop, or whatever the correct interpretation may be of the tool called, in Oriental parlance, a "jhām," and to manipulate which a pole is used, varying in length as necessity requires, from 12 ft. to 24 ft. or so.

Sinking operations are commenced by inserting the end of the aforesaid long handle into the nozzle of the "jhām" as it hangs dangling from the windlass; the men then let go the latter, and the whole affair, pole and all (not including the windlass, of course), is allowed to fall to the bottom as fast as it can go, and woe betide the incautious Hindoo who gets in the way of the handles, which spin round with a force enough to pulverize even a much thicker cranium than his. The long-handled apparatus is now worked vigorously to and fro, with a downward pressure, in order to get a good hold of the bottom; after which the pole is disengaged from the jhām, and rested against the inside of the well, preparatory to being hoisted up, hand over hand, for another good dig.

It may be remarked that this very effective iron implement, though dropping down as a matter of course vertically, is by a delightfully simple self-acting contrivance, drawn up horizontally, and when fairly loaded, may be considered to hold about 2 cubic feet of sand. On this reaching the surface, after the customary hauling, shouting, and frantic attitudinising, so essential to the success of any combined muscular efforts on the part of Indian workmen, it is tumbled out of the jhām, shovelled into the trough, and carried away,—not in wheelbarrows exactly, but, after the fashion of the East, in baskets, on the shaved and thickly covered heads of her Majesty's faithful and loyal black lieges. Speaking of wheelbarrows, reminds me of having seen or heard it mentioned, that on occasion of their being introduced for the first time on some work in that country of solar influence and "sola topees," these simple-minded people, after filling them with earth, proceeded to put the whole affair bodily on to their heads—basket fashion. Oh, ye navvies of England, think of that!

It has been remarked that the sand is cleared away to some distance all round the lines of blocks, and this is a territory carefully preserved from sandy encroachments of any sort, for reasons already stated. As the work proceeds, the sides of the cutting subside with serious intentions of sloping towards the blocks; but this can be prevented by taking a hint from the premonitory cracks as they appear now and then. The cavity occupied by the sinking block is called the "crater," but the term to my limited understanding was vastly more suggestive of Vesuvius than anything so decidedly aquatic as block-sinking; but this may be considered hyper-criticism, perhaps, by the learned in such matters.

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To the practical mind, "hoop-iron" bond had of course suggested itself as an antidote for this disorder, and had been used in considerable quantities, it appears, but was afterwards discontinued on the important discovery being made that blocks *did* always fulfil their destiny somehow, no matter how much cracked; under which happy circumstances it was quite immaterial whether they had hoop-iron in them or not, and that using it, therefore, would be a sheer waste of the sinews of war. Thus another proof had to be recorded that there are many more wondrous things in the world to be noted than were ever dreamt of in this poor traveller's philosophy.

When the blocks have been sunk to their full depth of 20 ft., the wells are filled in with sand (there was certainly no necessity for using anything else that I could see, all things considered, but which there is no use enumerating here); then strongly arched over inside by means of the notches—cacophonously styled "skew-backs"—left for this purpose with such exquisite forethought when building the last 8 ft. of the block. The spaces between the blocks are also filled in with brickwork, and presto! the whole foundation is then complete, and approximates to what is so neatly delineated on the plan. But why not exactly? Simply because it is invariably found that the blocks when sinking have shifted more or less from the positions originally assigned them, though, generally speaking—with the four-well blocks—to no very embarrassing extent. With the narrow nautical-looking affair, though, whenever they *did* get a chance of going down properly, they turned about to every point of the compass, utterly uncontrollable members, in fact, of the block fraternity.

To an individual who, situate like myself, had never seen anything of the kind before, several long rows of these sinking blocks, with the crowds of people working on them, present a very curious spectacle, even in daytime; but at night, by torch-light, the scene is indescribably odd and picturesque; the effect being so much enhanced as it is by the whole of the *tableau* being reflected from the still surface of the lake in which the blocks have become gradually and totally isolated. A distant view of these nocturnal well-sinkers, with all their paraphernalia of office, working away "by the light of the moon," when there is one, and always with torches, whether there is or not, might be likened, for want of something better, to swarms of belligerent black ants illuminated in their conflict by an army-works corps of fire-flies. Something better and more appropriate than the above may suggest itself, perhaps, to the more fervid imagination of the reader.

Speaking of scenic effect, though, let me pay a passing tribute to the enchanting view from the place where all these interesting works were going on. About ten or twelve miles off were the low rugged outlined hills of the Siwalik range, so full of geological interest; these were backed by the "*hills*,"—*par excellence*,—and on a fine day could be seen some forty miles off, dotted about on their summits between 6,000 ft. and 7,000 ft. above sea-level, the comfortable domiciles of that very celestial retreat already spoken of, and happy indeed the man who can flit thither from all the turmoil and abominations of life in the plains. The finest features in the landscape, though, are the magnificent peaks of the "Snowy Range," standing out in such bold relief against their background of blue sky;—altogether, in fact, as pretty a picture as can well be seen, and highly refreshing to the poor wretches with "liver" and blue-devils who can't get there.

The end of the working season, *i.e.*, a little before the middle of June, in the beds of rivers, is characterised by all the hurry-scurry usual in mundane affairs when preparing for any great event, and when something or other *will* always be left to the last. All the "*res impedimenta*" of brick-and-mortar life are now cleared away from the scene of action, and everything supposed to be in readiness for the burst of the rains, and one of those terrific-looking floods or "raos," as they are called in the vernacular, which so scared the poor writer once when he was caught in one of them, and with not a moment to lose in reaching *terra firma*: a decided case of *sauve qui peut* it is on such occasions, let me tell you. On the river bed being deserted in favour of its legitimate owner, nothing but the tops of the submerged blocks, and the huge mounds of sand excavated to make room for them, remain to show how much has been made of irrecoverable opportunities.

These mounds are fortunately but perishable relics of human industry, and their soft masses soon yield to the first rush of mighty waters, leaving the surface of the river bed afterwards as if nothing had happened to disturb the serenity of its repose.

To convey some idea of the importance of the work for which all these 298 blocks were required, and which, if put one on the top of another, would make a column above 9 furlongs high, it is necessary to state that they were intended to carry the piers and abutments of a work comprising fifteen tunnels, each 192 ft. long, and through which the rainfall on 216 square miles of country was to flow by fits and starts,—if not for all eternity, at all events, long past the anticipated advent of that mythical New Zealand celebrity who is to come some fine day and sketch the perishable remains of our fine brick-and-mortar metropolis! Over this row of tunnels, 24 ft. above the river bed, was to be a noble channel for conveying the body of water 170 ft. wide, and, when necessary, 10 ft. deep, destined to feed the canal and its branches, aggregating, when all finished, no less than 850 miles in length!

Now, considering the incalculable value of water in a country like India, the utter dependence of the people on the periodical rains, and the terrific famines that result occasionally from a total failure of that uncertain supply, it is impossible to over-estimate the boon that will be—and, as one of those awful events has already proved, *has* been—conferred on the country by distributing over one million acres and a half this magnificent supply of water, which has been running to waste in the sacred but much polluted stream of the Ganges ever since—when shall I say?—India rose from the sea,—if geologists have no objection.

On being informed of the bewildering fact that 122 millions of bricks (not the small English ones either) were required for building this wonderful structure, it instantly became necessary to cudgel my brains to pack all this material into some intelligible shape before being able to comprehend how much could be done with it. Put end on end, these bricks would reach 23,106 miles, which is not far short of three times and a half the circumference of the moon. Or if an idea less lunatic than this be preferred, the material could be represented by a brick-and-mortar pyramid, 400 ft. square at the base, and 280 ft. high. Compared bulk for bulk, with some of the first-class works in England in these days, this aqueduct would make very nearly seven Britannia Bridges, barring the tubes of course,—a little above five Tweed Viaducts, and something over twelve Newcastle High-level Bridges.

The whole of the work was calculated to cost 300,000*l.*, and to give some idea of the difference between the cost of brick and mortar in England and in India, calculated at the Newcastle rates, the bill for this little job would have run up to something about *two millions* sterling. Since the mutiny, however, what with the introduction of railways on all sides of India, and the unpleasant consequences attending the universal greed for cotton, prosperity has made such giant strides throughout the land, that cheapness, even in the item of brick and mortar, is no longer the order of the day. The changes that have been brought about by the above causes are more remarkably exhibited in the case of all the common necessaries of life, which in many parts of India have more than quadrupled in cost, much to the disgust of my poor exiled friends on fixed incomes; at least so, from "Over the sea, over the sea," that's what my "little bird whispers to me."

But I have not done with those everlasting blocks yet, though such a long digression as the above may possibly have encouraged such an idea.

Regarding the comparative merits of rectangular blocks and cylindrical wells, to which an allusion was made in a foregoing paragraph, I may mention that the latter have been used in the foundations of the East-Indian Railway Bridge across the river Jumna, at Allahabad, and were constructed under very different circumstances from the foundation blocks of the "Solani aqueduct." Ah! that's the name of my old friend.

Whilst the bed of the Solani, as it has been seen, is dry during the working season, and thus affords every facility for building operations, the river Jumna on the other hand, at the site of the bridge which was selected on account of the river being so shallow thereabouts, has, it appears, an average depth of 15 ft. in it at low water.

Here, then, was a formidable obstacle to contend with, and it was cleverly overcome by forming artificial islands on which to lay the iron curbs (not timber frames in this case), of the ten cylinders, 13½ ft. diameter required for each pier. These wells are sunk 43 ft. below low-water level, and consequently at an average depth of 28 ft. below the bed of the river. This is 8 ft. deeper than the foundations of the Solani aqueduct, and certainly not more than sufficient, considering, as I understand it, their totally unprotected condition, and the enormous body of water that will impinge upon the piers during high floods.

The heaviest floods in the Solani are provided for by piers 12½ ft. high to springing of arch; whilst the rise of the Jumna in ordinary floods is no less than 45 ft., and, on more occasions than one, as much as 51½ ft. During the last *débâcle* of this sort, in 1861, the sand supporting the cylinders got washed away, and four of them toppled over on to their sides. Great must have been the fall thereof! and it is very certain that all the king's horses, and all the king's men, will never put *those* Humpty-Dumpties on their legs again.

It has been stated somewhere in this paper that extraordinary care had been taken to protect the foundations of the Solani Aqueduct from the action of the current during floods. This was accomplished by building a solid flooring 3 ft. thick over the whole of the waterway between the two abutments: and a precious long tough job it must have been, besides no end of cunning devices on a very extensive scale on the up and down stream sides of the work. By these measures, then, the whole of the foundations are hermetically sealed, as it were; and it may safely be predicted, I think, that the stability of the structure is positively beyond all reach of danger.

Although the body of water that passes down the Solani during floods is, beyond all comparison, less than what it is in the Jumna, still it must be remembered how the current is affected by the obstacles presented to its progress in the shape of fourteen piers, each 216 ft. long, 10 ft. thick, and only 50 ft. apart. Hence the necessity, no doubt, for the wise precaution in making the foundations of this work so impregnable to attack.

Now, in the case of the Jumna Bridge, there are fourteen piers 205 ft. apart, and, as nearly as I can ascertain, 74 ft. long, and 25 ft. thick. There is no flooring, of course, as in the case of the Solani aqueduct, and, like that work, the foundations are sunk in sand of unknown depth. The foundations of the piers are thus isolated, as far as the bed of the river is concerned; and their future safety must depend upon the depth (28 ft.) to which the cylinders composing them have been sunk proving sufficient; or, in other words, upon the river being good enough not to scoop out the sand below that depth in any of its uncontrollable vagaries. The piers of this noble bridge have an abundance

beyond their ken, it may be mentioned that a friend of mine had indulged in the luxury of very ordinary brass locks for his bungalow-doors; and sure enough every one of them became quite useless before long; and, in many cases, the handles wrenched off in trying to do what any one of our own blessed infants acquires a knowledge of as soon as it is old enough to reach the much-coveted object.

The works that came under my observation, and on which swarms of natives were working away as busy as bees—though such instinctive industry is by no means a remarkable attribute of that interesting people—were the foundations of a gigantic aqueduct, compared with which all other conduits of water, ancient and modern, were verily not to be mentioned in the same breath; in short, nothing like it on the planet. Operations were being carried on in the bed of a river of some considerable width, as dry as the table I am writing at for several consecutive months in the year; and during the rainy season the scene occasionally of such very heavy torrents, that it was difficult for uninitiated man to conceive by what scientific means anything could be constructed to withstand their violence; especially when it is known that the integrity of the river bed, consisting of sand and water of unknown depth, can be only permanently secured by the most consummate skill and good management; failing which, it would be scooped out here, there, and everywhere, and every blessed thing along with it.

The difficulty of laying in the foundations of a work 20 ft. deep by any other process than the one to hand can be easily understood, from the fact of the perennial spring water lying so near the surface that it was utterly impracticable digging down more than 5 ft. or 6 ft. in the usual way, and that by no means an easy matter. It is true that the means employed for overcoming a difficulty of this nature are extremely simple, and, after all, but an improvement on the plan that has been in use by the natives of India from time immemorial; but it is on this very account they are so well worthy of notice, as not only being admirably adapted to the comprehension of the Asiatic and the undeveloped resources of his charming but very tepid part of the globe, but also as being so desirable of introduction elsewhere.

It may be stated, in a few words, that the native method of obtaining foundations for their bridges and such-like, is sinking a number of brick cylinders,—or "wells," as they are generally called, I believe,—which are afterwards filled in with earth or concrete, domed over, connected together, and built upon as they best may. In the work that I am presuming to scribble about, the choice was said to lie between pile-driving and "blocks," the relative merits of which, and the reasons of preferring the latter to the former, though duly impressed upon my bewildered mind at the time, is really much too serious and recondite a matter to take in hand just at this moment—much to the reader's satisfaction, no doubt.

The advantages of rectangular blocks over circular wells, to build upon, are far too manifest, one would think, to need any special disquisition on that head, substantiality and their adaptation to the form of superstructure being not the least important of them; and yet these wells have since been extensively used on some important works now in progress in another part of the country, which will be noticed hereafter. In regard to the system adopted on this occasion, the style of procedure appeared to be as follows. After divers optical feats had been performed with level and theodolite, to fix with mathematical accuracy the position of piers and abutments, operations were commenced by clearing away as much of the sand as the walls below would admit of, and this appeared to be about 2 ft. or so below the surface of the river bed, a damp, uncomfortable-looking place being now exposed to view. The next part of the business was to lay down enormously-massive timber frames, consisting of roughly-squared trunks of common jungle trees, firmly fitted and bolted together, all arranged in apple-pie order for the walls of the blocks which were to be built upon them.

To make the matter sufficiently intelligible, and speak in round numbers—though very near the mark—we will assume the foundations for one of the piers to be 200 ft. long, 20 ft. wide, and 20 ft. deep; this would consist of nine cubes of 20 ft., placed between 2 ft. and 3 ft. apart, and which are built up first of all to a height of 12 ft. The walls of each block are so constructed as to form four cavities, or "wells," as they are called, 6 ft. square, for the convenience of getting out the sand, as will be seen further on. Common trestle windlasses are next placed on the top of the blocks, one over each well, and strong wooden troughs laid in a slanting position against the walls, to perform the twofold office of an inclined plane for the workpeople to go up and down upon, and a slide for the sand that is to be scooped up from the bowels of the earth.

Coincident with the later operations is the very important one of digging away the sand as deep as can be managed from a distance of 20 ft. or 30 ft., parallel to the lines of blocks; for the sand not so excavated, be it known, would, in the course of undersinking (as the operation is called) find its way into the wells, which, for obvious reasons, would be a much more troublesome and expensive way of getting rid of it than by digging after the usual manner of mortals. Each of the windlasses is provided with a large ponderous iron spade, scoop, or whatever the correct interpretation may be of the tool called, in Oriental parlance, a "jhām," and to manipulate which a pole is used, varying in length as necessity requires, from 12 ft. to 24 ft. or so.

Sinking operations are commenced by inserting the end of the aforesaid long handle into the nozzle of the "jhām" as it hangs dangling from the windlass; the men then let go the latter, and the whole affair, pole and all (not including the windlass, of course), is allowed to fall to the bottom as fast as it can go, and woe betide the incautious Hindoo who gets in the way of the handles, which spin round with a force enough to pulverize even a much thicker cranium than his. The long-handled apparatus is now worked vigorously to and fro, with a downward pressure, in order to get a good hold of the bottom; after which the pole is disengaged from the jhām, and rested against the inside of the well, preparatory to being hoisted up, hand over hand, for another good dig.

It may be remarked that this very effective iron implement, though dropping down as a matter of course vertically, is by a delightfully simple self-acting contrivance, drawn up horizontally, and when fairly loaded, may be considered to hold about 2 cubic feet of sand. On this reaching the surface, after the customary hauling, shouting, and frantic attitudinising, so essential to the success of any combined muscular efforts on the part of Indian workmen, it is tumbled out of the jhām, shovelled into the trough, and carried away,—not in wheelbarrows exactly, but, after the fashion of the East, in baskets, on the shaved and thickly covered heads of her Majesty's faithful and loyal black lieges. Speaking of wheelbarrows, reminds me of having seen or heard it mentioned, that on occasion of their being introduced for the first time on some work in that country of solar influence and "sola topees," these simple-minded people, after filling them with earth, proceeded to put the whole affair bodily on to their heads—basket fashion. Oh, ye navvies of England, think of that!

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must be admitted, for exercising the vigilance of the watchful eye. If night sinking economise time, to what extent, if any, it is *pecuniarily* profitable deponent sayeth not, because no one could enlighten him.

It has been observed that these under-sinking operations are necessarily restricted to the dry season of the year, and, as enterprising people are generally ambitious of doing more than they can well get through within a given time, the latter commodity is therefore very precious with our block-sinkers, and their brick-and-mortar pets are always on the move long before they are sufficiently hardened for the trials in store for them: the consequence is that, as the four walls cannot all be operated upon exactly alike, an unequal strain is thus brought to bear upon the timbers underneath, and the walls are given to splitting in divers directions. On looking aghast at these cracks of ominous import, I was assured, with unsurpassed equanimity, that they would all close up again as the blocks went down, and that the cracks were really only formidable in a superterrestrial point of view. It need only be said, then, that the results fully justified this disregard of any such trifles as would drive a house-builder to commit suicide on the spot. If a block *did* come to grief, however, when far down, its *diejecta membra*, I opined, would be an insuperable obstacle to sinking a new one in its place.

To the practical mind, "hoop-iron" bond had of course suggested itself as an antidote for this disorder, and had been used in considerable quantities, it appears, but was afterwards discontinued on the important discovery being made that blocks *did* always fulfil their destiny somehow, no matter how much cracked; under which happy circumstances it was quite immaterial whether they had hoop-iron in them or not, and that using it, therefore, would be a sheer waste of the sinews of war. Thus another proof had to be recorded that there are many more wondrous things in the world to be noted than were ever dreamt of in this poor traveller's philosophy.

When the blocks have been sunk to their full depth of 20 ft., the wells are filled in with sand (there was certainly no necessity for using anything else that I could see, all things considered, but which there is no use enumerating here); then strongly arched over inside by means of the notches—cacophonously styled "skew-backs"—left for this purpose with such exquisite forethought when building the last 8 ft. of the block. The spaces between the blocks are also filled in with brickwork, and presto! the whole foundation is then complete, and approximates to what is so neatly delineated on the plan. But why not exactly? Simply because it is invariably found that the blocks when sinking have shifted more or less from the positions originally assigned them, though, generally speaking—with the four-well blocks—to no very embarrassing extent. With the narrow nautical-looking affair, though, whenever they *did* get a chance of going down properly, they turned about to every point of the compass, utterly uncontrollable members, in fact, of the block fraternity.

To an individual who, situate like myself, had never seen anything of the kind before, several long rows of these sinking blocks, with the crowds of people working on them, present a very curious spectacle, even in daytime; but at night, by torch-light, the scene is indescribably odd and picturesque; the effect being so much enhanced as it is by the whole of the *tableau* being reflected from the still surface of the lake in which the blocks have become gradually and totally isolated. A distant view of these nocturnal well-sinkers, with all their paraphernalia of office, working away "by the light of the moon," when there is one, and always with torches, whether there is or not, might be likened, for want of something better, to swarms of belligerent black ants illuminated in their conflict by an army-works corps of fire-flies. Something better and more appropriate than the above may suggest itself, perhaps, to the more fervid imagination of the reader.

Speaking of scenic effect, though, let me pay a passing tribute to the enchanting view from the place where all these interesting works were going on. About ten or twelve miles off were the low rugged outlined hills of the Siwalik range, so full of geological interest; these were backed by the "*hills*,"—*par excellence*,—and on a fine day could be seen some forty miles off, dotted about on their summits between 6,000 ft. and 7,000 ft. above sea-level, the comfortable domiciles of that very celestial retreat already spoken of, and happy indeed the man who can flit thither from all the turmoil and abominations of life in the plains. The finest features in the landscape, though, are the magnificent peaks of the "Snowy Range," standing out in such bold relief against their background of blue sky;—altogether, in fact, as pretty a picture as can well be seen, and highly refreshing to the poor wretches with "liver" and blue-devils who can't get there.

The end of the working season, *i.e.*, a little before the middle of June, in the beds of rivers, is characterised by all the hurry-scurry usual in mundane affairs when preparing for any great event, and when something or other *will* always be left to the last. All the "*res impedimenta*" of brick-and-mortar life are now cleared away from the scene of action, and everything supposed to be in readiness for the burst of the rains, and one of those terrific-looking floods or "raos," as they are called in the vernacular, which so scared the poor writer once when he was caught in one of them, and with not a moment to lose in reaching *terra firma*: a decided case of *sauve qui peut* it is on such occasions, let me tell you. On the river bed being deserted in favour of its legitimate owner, nothing but the tops of the submerged blocks, and the huge mounds of sand excavated to make room for them, remain to show how much has been made of irrecoverable opportunities.

These mounds are fortunately but perishable relics of human industry, and their soft masses soon yield to the first rush of mighty waters, leaving the surface of the river bed afterwards as if nothing had happened to disturb the serenity of its repose.

To convey some idea of the importance of the work for which all these 298 blocks were required, and which, if put one on the top of another, would make a column above 9 furlongs high, it is necessary to state that they were intended to carry the piers and abutments of a work comprising fifteen tunnels, each 192 ft. long, and through which the rainfall on 216 square miles of country was to flow by fits and starts,—if not for all eternity, at all events, long past the anticipated advent of that mythical New Zealand celebrity who is to come some fine day and sketch the perishable remains of our fine brick-and-mortar metropolis! Over this row of tunnels, 24 ft. above the river bed, was to be a noble channel for conveying the body of water 170 ft. wide, and, when necessary, 10 ft. deep, destined to feed the canal and its branches, aggregating, when all finished, no less than 850 miles in length!

Now, considering the incalculable value of water in a country like India, the utter dependence of the people on the periodical rains, and the terrific famines that result occasionally from a total failure of that uncertain supply, it is impossible to over-estimate the boon that will be—and, as one of those awful events has already proved, *has* been—conferred on the country by distributing over one million acres and a half this magnificent supply of water, which has been running to waste in the sacred but much polluted stream of the Ganges ever since—when shall I say?—India rose from the sea,—if geologists have no objection.

On being informed of the bewildering fact that 122 millions of bricks (not the small English ones either) were required for building this wonderful structure, it instantly became necessary to cudgel my brains to pack all this material into some intelligible shape before being able to comprehend how much could be done with it. Put end on end, these bricks would reach 23,106 miles, which is not far short of three times and a half the circumference of the moon. Or if an idea less lunatic than this be preferred, the material could be represented by a brick-and-mortar pyramid, 400 ft. square at the base, and 280 ft. high. Compared bulk for bulk, with some of the first-class works in England in these days, this aqueduct would make very nearly seven Britannia Bridges, barring the tubes of course,—a little above five Tweed Viaducts, and something over twelve Newcastle High-level Bridges.

The whole of the work was calculated to cost 300,000*l*., and to give some idea of the difference between the cost of brick and mortar in England and in India, calculated at the Newcastle rates, the bill for this little job would have run up to something about *two millions* sterling. Since the mutiny, however, what with the introduction of railways on all sides of India, and the unpleasant consequences attending the universal greed for cotton, prosperity has made such giant strides throughout the land, that cheapness, even in the item of brick and mortar, is no longer the order of the day. The changes that have been brought about by the above causes are more remarkably exhibited in the case of all the common necessaries of life, which in many parts of India have more than quadrupled in cost, much to the disgust of my poor exiled friends on fixed incomes; at least so, from "Over the sea, over the sea," that's what my "little bird whispers to me."

But I have not done with those everlasting blocks yet, though such a long digression as the above may possibly have encouraged such an idea.

Regarding the comparative merits of rectangular blocks and cylindrical wells, to which an allusion was made in a foregoing paragraph, I may mention that the latter have been used in the foundations of the East-Indian Railway Bridge across the river Jumna, at Allahabad, and were constructed under very different circumstances from the foundation blocks of the "Solani aqueduct." Ah! that's the name of my old friend.

Whilst the bed of the Solani, as it has been seen, is dry during the working season, and thus affords every facility for building operations, the river Jumna on the other hand, at the site of the bridge which was selected on account of the river being so shallow thereabouts, has, it appears, an average depth of 15 ft. in it at low water.

Here, then, was a formidable obstacle to contend with, and it was cleverly overcome by forming artificial islands on which to lay the iron curbs (not timber frames in this case), of the ten cylinders, 13½ ft. diameter required for each pier. These wells are sunk 43 ft. below low-water level, and consequently at an average depth of 28 ft. below the bed of the river. This is 8 ft. deeper than the foundations of the Solani aqueduct, and certainly not more than sufficient, considering, as I understand it, their totally unprotected condition, and the enormous body of water that will impinge upon the piers during high floods.

The heaviest floods in the Solani are provided for by piers 12¼ ft. high to springing of arch; whilst the rise of the Jumna in ordinary floods is no less than 45 ft., and, on more occasions than one, as much as 51½ ft. During the last *débâcle* of this sort, in 1861, the sand supporting the cylinders got washed away, and four of them toppled over on to their sides. Great must have been the fall thereof! and it is very certain that all the king's horses, and all the king's men, will never put *those* Humpty-Dumpties on their legs again.

It has been stated somewhere in this paper that extraordinary care had been taken to protect the foundations of the Solani Aqueduct from the action of the current during floods. This was accomplished by building a solid flooring 3 ft. thick over the whole of the waterway between the two abutments: and a precious long tough job it must have been, besides no end of cunning devices on a very extensive scale on the up and down stream sides of the work. By these measures, then, the whole of the foundations are hermetically sealed, as it were; and it may safely be predicted, I think, that the stability of the structure is positively beyond all reach of danger.

Although the body of water that passes down the Solani during floods is, beyond all comparison, less than what it is in the Jumna, still it must be remembered how the current is affected by the obstacles presented to its progress in the shape of fourteen piers, each 216 ft. long, 10 ft. thick, and only 50 ft. apart. Hence the necessity, no doubt, for the wise precaution in making the foundations of this work so impregnable to attack.

Now, in the case of the Jumna Bridge, there are fourteen piers 205 ft. apart, and, as nearly as I can ascertain, 74 ft. long, and 25 ft. thick. There is no flooring, of course, as in the case of the Solani aqueduct, and, like that work, the foundations are sunk in sand of unknown depth. The foundations of the piers are thus isolated, as far as the bed of the river is concerned; and their future safety must depend upon the depth (28 ft.) to which the cylinders composing them have been sunk proving sufficient; or, in other words, upon the river being good enough not to scoop out the sand below that depth in any of its uncontrollable vagaries. The piers of this noble bridge have an abundance

of elbow-room, it is true; and experience has doubtless settled the important fact long ere this, that the stability of their respective ten stilts is not dangerously affected in any way, even by a flood above 66 ft. deep, going at the easy pace of 9 miles an hour.

It used to be a favourite remark at one time, that on the annihilation of British power in the East,—and in the general order of things, such must be the case some day, I suppose; to wit, when our friend, the New Zealander, will be taking a trip to India, to sketch all the fine ruins there,—the only trace left behind him by the enterprising Anglo-Saxon would be his empty beer-bottles. To these vitreous remains of fallen grandeur might be added, perhaps, the melancholy fragments of a "grand trunk road." The construction of the Ganges Canal was decidedly the first thing accomplished towards removing this standing reproach from a power, in whose dominions, to use another favourite expression, the sun never sets. All honour, then, to the man who originated the idea and boldly carried it out. Since then the railroads, with their magnificent and unrivalled viaducts, are in a fair way of impressing the land with some indelible marks of British pluck and enterprise.

I can honestly recommend my travelling countrymen who have "done" the Continent, just to take a passage in a Peninsular and Oriental steamer, and "do" Bombay (I'll warrant they can get the compliment returned), and delight their eyes with a sight of the Bhore Ghaut incline, on the Great Indian Peninsula Railway; for *this* alone would the trip repay him, to say nothing of the renowned antiquarian wonders of Ellora and Adjunta, the former only forty, and the latter but twenty miles distant from that line of railway. Why, that incomparable old fort at Dowlatabad, close to Ellora, and such a pretty road to it, with its labyrinthine tunnelings, and matchless scarp of 150 ft. (it looks double this when close to it), all cut out of the hard trap rock; its picturesque ramifications of old fortified walls, and the lovely view from the breezy summits,—surely these sights alone are worth going all the distance to see.

But, for a few parting words about the Bhore Ghaut Incline, if only to tempt the reader to go and judge for himself. I have the most pleasing recollection of going over this astonishing work shortly before it was opened, in company with the intelligent contractor, Mr. C. We took our seats on a trolly early one fine morning, at Kandalla, the station situate on the summit of the incline. "But, before going on any further, Mr. Scribbler, pray say what is a *trolly?*" Well, the simplest looking form of conveyance in the world—nothing, in fact, but an unprotected platform on four wheels, as *I* saw it; and the novel sensation, let me tell you, of being whisked along at some fearful pace, with but imperfect confidence in the means of checking it, down this inclined plane, by the mere force of gravity, through pitch-dark tunnels, along giddy precipices, and over unfathomable-looking abysses, was as nearly like going to perdition in a dogcart as anything I can possibly imagine.

The incline traverses a hilly region composed of the toughest basalt: so the difficulty of boring the twenty-five tunnels through it, aggregating some 4,000 running yards, may be easily imagined. The road altogether is 15¼ miles long, rising in this short distance a height of 1,832 ft. The steepest gradient is 1 in 37, and the whole work occupied a period of seven years and a half, costing at the rate of 68,750*l.* per mile.

One of the cleverest engineering devices yet seen in railway work is the "reversing station," as it is called, where the position of the train in regard to the engine is reversed, *i.e.*, the head of it becoming the tail.

The wildness of the scenery on this road is something charming to behold. There are several commanding peaks about Kandalla, and one of them would be very appropriately surmounted with a colossal statue of the eminent engineer, Mr. J. J. Berkley, whose decease not long before the completion of his magnificent work was a source of such deep regret to every one connected with it.

Hoping that all the foregoing prosaic details of my wanderings from "far away in the north-west" to the Bhore Ghaut Incline have not been found too overpowering, I shall now reward the reader's patience by subscribing myself, in the language of my little bird "over the sea," his very obedient servant, RAJ MISTRI.

THE MASTER BUILDERS AND THE OPERATIVES OF THE MIDLAND COUNTIES.

THE feeling against the proposed "Discharge Note" increases: further meetings have been held in Birmingham, Manchester, Malvern, Nottingham, and London, the object of those in the last place being to raise money for the support of the men on strike in the country. At Nottingham, the meeting resolved,—

"That we, the members of the various branches of the building trades in Nottingham in general meeting assembled, pledge ourselves to oppose by all lawful means the discharge-note, better known as the ticket-of-leave system, now attempted to be forced upon us by the Master Builders' Association.

As the carpenters and joiners of Birmingham have been the first to take action in opposition to the discharge-note, and no doubt before long the whole of the various branches of the building trades will be drawn up in battle array against the proposed system; we therefore pledge ourselves and call upon all who are employed in the building trade to organise themselves and assist by contributions those who are or may be on strike until the withdrawal by the Association of the discharge-note."

Besides the statement from the secretary of "The General Builders' Association," and the communications from two builders, printed in our last, we have received several angry letters, from master builders in the Midland Counties, reprimanding us for not advocating the acceptance of the "Discharge Note" by the men, and calling upon us (one with a childish threat), immediately to retract the opinion we had expressed. On the other hand, two very respectable members of the Builders' Association, of course in a quite different tone, inform us that they see they are asking for a power they ought not to have; and moreover one they are not likely to get,—at any rate, without a long and costly struggle; and have determined on not striving for it with their men.

We have been sneered at in St. Martin's Hall, and yelled at in Smithfield, when, in times gone by, we had expressed opinions adverse to unwise and unjust steps taken by the operatives; and our course was as much affected by those thoughtless demonstrations as it will be by the master builders' letters now,—that is, not at all. We can fully appreciate and lament the injury inflicted on the masters by acts of the trade unions, and the poverty and demoralization often resulting to the men themselves; but we cannot think that the "Discharge Note" will prove the remedy. The Resolution of the masters * sets forth that the determination to require the production of the "Discharge Note" from a workman before taking him on is come to with a view to counteract "the evils resulting, both to masters and operatives, from unjustifiable strikes and combinations." It is to be effective, however, in the case of *all* strikes, and all strikes and combinations are not unjustifiable, as the masters of course admit by themselves combining, as they have a perfect right to do. Combination is the secret of the day: men combine that they may enjoy a fine house in Pall-mall, instead of uncomfortable lodgings; we combine to insure; we combine in companies "limited" to trade; the lawyers combine in Chancery-lane, the architects in Conduit-street, and the trades in every town. Men in all positions "strike," too, if the terms of employment cease to be satisfactory. What the great combination, Society, has to do is to see that these minor combinations are not turned to evil account, and, by the dissemination of knowledge, to prevent unnecessary and injurious strikes. *All* strikes and combinations, then, are not unjustifiable, but, *quoad* the "Discharge Note," would be considered so. The more we think of the matter, the more thoroughly do we feel convinced that the operatives will never accept the proposed note; and we earnestly exhort the Builders' Association to withdraw it at once, before bad feeling be engendered and money wasted. We agree with their secretary in hoping sincerely that some means may be adopted, arbitration or otherwise, to adjust differences between capital and labour, and prevent the occurrence of strikes, with their fearful accompaniments of poverty, demoralization, and not seldom death.

* The following, as we understand, is the present form of the resolution come to by the "General Builders' Association":—

"That with a view to counteract the evils resulting both to masters and operatives from unjustifiable strikes and combinations, the following plan be adopted:—That on and after the 1st day of January, 1865, every member of this Association shall, upon paying off any operative, deliver him a discharge-note (in form to be supplied by the committee), which shall state the man's name, and shall be signed by or for the master. That each member of the Association pledges himself not to take into his employ any operative who (having previously worked for a member of this Association) does not first produce and deliver to his proposed employer his former discharge-note, or, in case of its loss, the name and residence of his previous employer, for reference."

OBSTRUCTION OF LIGHT AND AIR.

A CASE was tried lately in the Court of Common Pleas, Westminster, before Chief Justice Erle, a report of which may be useful to some of our readers. It was an action for the obstruction of an ancient window in a room built out at the back of the house No. 9, George-street, Hanover-square. The house belongs to Mr. Dodson (the plaintiff), who is one of the members of Parliament for the county of Sussex. This room and window had existed upwards of fifty years. It had been used as a library by Sheridan, who had written his plays in it. Dr. Pearson had lectured in it on medical subjects more than twenty years ago. Artists had used it for a studio; and for the last sixteen years it has been used by Miss Pace as a workroom for the young ladies in her millinery establishment. The window looked north, across the back yards of the adjoining houses in George-street, with little or no interruption as far as Maddox-street, and the light admitted through it was sworn to have been extremely good, and to have enabled Miss Pace to carry on her business, to match ribbands, and to work to a late hour. But in the course of this year the defendant (Mr. Cowland), who occupies No. 10, George-street, and whose back yard is immediately north of the window, put up a new building covering the whole of his back yard, except a space of the length of the window in dispute, and about 6 ft. wide, which was left unoccupied. The walls of his building were of such a height as to leave unobstructed the light coming to the window at an angle of 45 degrees to the horizon.

On the part of the plaintiff, Mr. Penfold and others gave evidence that light was obstructed, as did the tenant and some of her workpeople, to the effect that colours could not now be matched in the room as was formerly the case.

Mr. C. Barry, for the defendant, deposed that the new building was placed at such a distance (6 ft.) as to allow the light to the bottom of the window at an angle of 43°, and expressed his opinion that amongst the profession generally the admission of light at an angle of 45° was considered to suffice to prevent opposition. Mr. H. Currey and others concurred in this evidence. Stress was laid on the fact that, to allow of the erection of the new building, trees which had formerly obstructed the light, had been cut down, so that the room, it was asserted, was as light as ever.

The jury found a verdict for the plaintiff. The mode of obviating the evil has now to be settled, perhaps with fresh litigation.

It is desirable that it should be clearly understood (what the result of this trial confirms), that in law the 45° theory has no weight. The real question always is with the jury, has sufficient light been obstructed to make the room less valuable than it was before for a purpose to which it has been applied for twenty years? In the case of a special adaptation to a purpose for any shorter period, damages cannot be recovered for a deprivation of light which would reduce the room to its previous condition as to light. To put a case: if a room, used for twenty years for ordinary purposes, be appropriated for part of this time, because of its unusually good light, say to some artistic purpose, an obstruction which unfitted it for this purpose could not be prevented; but if it injuriously affected the room for its older purpose, the judge would have to direct a verdict for its abatement. The condition of the law in respect of light and air is not satisfactory, but improvement is not easy. It has been contended, that persons wishing to raise buildings or cover their own land, should have power to do so by compensating in money to an extent to be settled by a proper tribunal for any injury done to neighbour's rights; but it may be fairly asked in reply, Why should the adjoining owner be forced to sell that which he wishes to retain? Why should a rich and powerful man be permitted to buy up and override his perhaps poorer and weaker neighbour?

MEMORIAL SCULPTURE.—A marble bust of the late Duke of Richmond has been placed in the Assembly-room, at the County Hall, Lewes, under the personal superintendence of the sculptor, Mr. F. M'Dowell.

THE MANUFACTURE OF PERFUMES.

HORTICULTURAL SOCIETY.

AMONGST the popular lectures which have been lately delivered in the Conservatory, Mr. Septimus Piesse has given one on "Perfumes and the Methods of obtaining the Odours." The lecturer pointed out that, contrary to general belief, nearly all the perfumes derived from flowers are not made by distillation, but by the processes of *enfleurage*, or inflowering, and by maceration or infusion. The odours of flowers do not, as a general rule, exist in them as a store or in a gland, but they are developed as an exhalation. While the flower breathes, it yields fragrance; but kill the flower, and fragrance ceases. It has not been ascertained when the discovery was made of condensing, as it were, the breath of the flower during life: what we know now is, that if a living flower be placed near to butter, grease, animal fat, or oil, these bodies absorb the odour given off by the blossom, and in turn themselves become fragrant. If we spread fresh unsalted butter upon the inside of two dessert-plates, and then fill one of the plates with gathered fragrant blossoms of clematis, covering them over with the second greased plate, we shall find that after twenty-four hours the grease has become fragrant. The blossoms, though separated from the parent stem, do not die for some time, but live and exhale odour, which is absorbed by the fat. To remove the odour from the fat, the fat must be scraped off the plates and put into alcohol: the odour then leaves the grease and enters into the spirit, which thus become "scent," and the grease again becomes odourless.

The flower farmers of the Var follow precisely this method on a very large scale, making but a little practical variation, with the following flowers—rose, orange, acacia, violet, jasmine, tuberose, and jonquil.

The commercial importance of this branch of perfumes may be indicated by the quantity of flowers annually grown in the district of Cannes. Flower harvest: orange blossoms, 1,475,000 lb.; roses, 530,000 lb.; jasmine, 100,000 lb.; violets, 75,000 lb.; acacia, 45,000 lb.; geranium, 30,000 lb.; tuberose, 24,000 lb.; jonquil, 5,000 lb. The quantity produced at Nice has not been ascertained; with violets and orange there are more, but with cassie less than here stated.

The market season for orange-flowers at Nice lasts for more than a month, as an average, and during that time there are sold about fifteen to eighteen tons of flowers daily! and a ton of flowers will yield more than a kilogramme of otto (say forty ounces), worth 20*l.* sterling; and the residuary water, highly saturated with odour, is worth another 10*l.* note.

A surface of land, equalling an acre of planting, yields a hundred and eighty to two hundred pounds weight of flowers, valued as an average at two francs the pound. Violets may always be looked upon as an extra crop, growing as they do under the orange and lemon trees. The kind grown is the double Parma. About twenty-five tons weight of violet-blossoms are produced annually at Nice.

In France, the commerce in perfumes has risen to the annual value of 3,000,000*l.* sterling.

THE EMPLOYMENT OF YOUNG CHILDREN IN DANGEROUS MANUFACTORIES.

A SAD case, which clearly shows the necessity for interference with the manner in which the health and lives of children are risked, has just been brought under the public notice. The facts, as they were laid before the coroner's jury, are briefly as follow:—At a match manufactory in Stratford New Town, an explosion took place which destroyed the life of a boy twelve years of age, blew out the windows, and did other damage to the premises. Philip Debor, a German, who was the manager of the match manufactory, said Vesuvian lights were being made with a compound of gum, phosphorus, nitre, chloride of potash, Venetian red, and plaster of Paris. [A potent chemical brewing to be allowed to be made in an inhabited neighbourhood!] Witness had to dip the wood for the Vesuvians into it. He gave the stick to the boy, and said to him, "You stir him von leetle bit." He turned round to go into the factory, and before he got two steps the whole affair blew up; the stuff struck him on the back; the windows were blown in; and on looking he saw deceased lying on the ground all in a blaze. In Germany, he said, boys were not employed to stir the composition or turn the frame; but it was usual to employ them in England. Old men are employed in some manufactories; but he supposed that children were cheaper, and "competition is keen." This was the main evidence.

It transpired that the superintendent of the laboratory was a *military* gentleman. We should have thought that a *chemical* superintendent would have been the most fit for this office. It is to be feared, however, that neither the one nor the other will prevent the employment of very young children in this description of work until fresh powers of interference are given. In this case alone there are fifteen children employed, deceased having been the oldest.

There is one thing, however, which can now be done, after a grace of twenty years which has been allowed for the removal of dangerous trades from populous neighbourhoods: they can now be legally removed; and this is necessary for the public protection.

In the present case of death, the jury, after recording the especial cause, said they considered that the manufacturer was open to censure for entrusting such combustible materials to children of so young an age, and they recommended that in future chloride of potash should be melted with water, and so rendered non-explosive before being mixed with the other ingredients of the composition.

So far the jury have done their duty; but no practical consequences worth naming will result from this verdict. No doubt the parents of the deceased child are poor people, and comparatively helpless. Many, however, think that if a few cases of this description were brought for consideration into the courts of law, damages would be awarded which might be the means of partially stopping this wrong and careless waste of human life.

THE SCOTTISH MEMORIAL OF THE PRINCE CONSORT.

THE designs sent in are now open for inspection in the National Gallery at Edinburgh.

No. 22. Design by Mr. Robert Matheson, is for a bronze equestrian statue of the Prince in front of the new General Post-office, on a pedestal of two stages; one enriched by bas-reliefs, and the other by allegorical figures.

No. 23, by Mr. J. Noel Paton, takes the form of "a memorial cross." The first stage of the structure is a platform of large dimensions and composed of six steps. From the base rises a square central shaft for the support of a statue of the Prince, and at the angles of this shaft are pillars with floriated capitals.

No. 49 is a temple, by Mr. J. T. Rochead, architect, and Mr. J. Steel, sculptor, Glasgow. The design is elaborate, and consists of numerous parts.

No. 7, by Messrs. William Slater and R. Herbert Carpenter, London, is an ornamented Gothic cross of three open stages. The lower compartment of the structure is occupied by a statue of the Prince.

Nos. 9 and 10, by Mr. D. Milne Holme, of Milne Graden, Berwickshire, are granite obelisks, and are illustrated by numerous drawings and two models. The obelisks are proposed to be 170 ft. in height, and in the base a chamber is formed to contain a statue of the Prince.

No. 21, bearing the motto, "The memory of the just is blessed," is a square tower, rising to a height of 380 ft., and resembling in outline the clock-tower of Westminster.

Nos. 24 and 25, designs, and model No. 53, illustrate design, accompanied by a model, by Mr. W. Calder Marshall. Mr. W. Calder Marshall has chosen as its main feature a Venetian shaft or column of polished red granite, surmounted by a statue of the prince, with a foliated capital, and a base illustrated by allegorical figures, in two stages, the first series being seated on projected pedestals, and the second,—like the first, four in number,—standing around the shaft. The lower series appears to represent those arts, and the upper those virtues, which may be held to be peculiarly associated with the career of the illustrious personage whose effigy surmounts the column.

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I can honestly recommend my travelling countrymen who have "done" the Continent, just to take a passage in a Peninsular and Oriental steamer, and "do" Bombay (I'll warrant they can get the compliment returned), and delight their eyes with a sight of the Bhore Ghaut incline, on the Great Indian Peninsula Railway; for *this* alone would the trip repay him, to say nothing of the renowned antiquarian wonders of Ellora and Adjunta, the former only forty, and the latter but twenty miles distant from that line of railway. Why, that incomparable old fort at Dowlatabad, close to Ellora, and such a pretty road to it, with its labyrinthine tunnelings, and matchless scarp of 150 ft. (it looks double this when close to it), all cut out of the hard trap rock; its picturesque ramifications of old fortified walls, and the lovely view from the breezy summits,—surely these sights alone are worth going all the distance to see.

But, for a few parting words about the Bhore Ghaut Incline, if only to tempt the reader to go and judge for himself. I have the most pleasing recollection of going over this astonishing work shortly before it was opened, in company with the intelligent contractor, Mr. C. We took our seats on a trolly early one fine morning, at Kandalla, the station situate on the summit of the incline. "But, before going on any further, Mr. Scribbler, pray say what is a *trolly?*" Well, the simplest looking form of conveyance in the world—nothing, in fact, but an unprotected platform on four wheels, as *I* saw it; and the novel sensation, let me tell you, of being whisked along at some fearful pace, with but imperfect confidence in the means of checking it, down this inclined plane, by the mere force of gravity, through pitch-dark tunnels, along giddy precipices, and over unfathomable-looking abysses, was as nearly like going to perdition in a dogcart as anything I can possibly imagine.

The incline traverses a hilly region composed of the toughest basalt: so the difficulty of boring the twenty-five tunnels through it, aggregating some 4,000 running yards, may be easily imagined. The road altogether is 15½ miles long, rising in this short distance a height of 1,832 ft. The steepest gradient is 1 in 37, and the whole work occupied a period of seven years and a half, costing at the rate of 68,750*l.* per mile.

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Hoping that all the foregoing prosaic details of my wanderings from "far away in the north-west" to the Bhore Ghaut Incline have not been found too overpowering, I shall now reward the reader's patience by subscribing myself, in the language of my little bird "over the sea," his very obedient servant, RAJ MISTRI.

THE MASTER BUILDERS AND THE OPERATIVES OF THE MIDLAND COUNTIES.

THE feeling against the proposed "Discharge Note" increases: further meetings have been held in Birmingham, Manchester, Malvern, Nottingham, and London, the object of those in the last place being to raise money for the support of the men on strike in the country. At Nottingham, the meeting resolved,—

"That we, the members of the various branches of the building trades in Nottingham in general meeting assembled, pledge ourselves to oppose by all lawful means the discharge-note, better known as the ticket-of-leave system, now attempted to be forced upon us by the Master Builders' Association.

As the carpenters and joiners of Birmingham have been the first to take action in opposition to the discharge-note, and no doubt before long the whole of the various branches of the building trades will be drawn up in battle array against the proposed system; we therefore pledge ourselves and call upon all who are employed in the building trade to organize themselves and assist by contributions those who are or may be on strike until the withdrawal by the Association of the discharge-note."

Besides the statement from the secretary of "The General Builders' Association," and the communications from two builders, printed in our last, we have received several a from master builders in the Midla reprimanding us for not advocating ance of the "Discharge Note" by t calling upon us (one with a child immediately to retract the opinion pressed. On the other hand, two v able members of the Builders' As course in a quite different tone, in they see they are asking for a powe not to have; and moreover one they a to get,—at any rate, without a long struggle; and have determined on for it with their men.

We have been sneered at in St. M and yelled at in Smithfield, when, in by, we had expressed opinions adver and unjust steps taken by the oper our course was as much affecte thoughtless demonstrations as it wil master builders' letters now,—that i We can fully appreciate and lament inflicted on the masters by acts o unions, and the poverty and demorali resulting to the men themselves; bu think that the "Discharge Note" wi remedy. The Resolution of the ma forth that the determination to requ duction of the "Discharge Note" from before taking him on is come to wit counteract "the evils resulting, both and operatives, from unjustifiable strik binations." It is to be effective, how case of *all* strikes, and all strikes ar tions are not unjustifiable, as the maste admit by themselves combining, as perfect right to do. Combination is of the day: men combine that they may enjoy a fine house in Pall-mall, instead of uncomfortable lodgings; we combine to insure; we combine in companies "limited" to trade; the lawyers combine in Chancery-lane, the architects in Conduit-street, and the trades in every town. Men in all positions "strike," too, if the terms of employment cease to be satisfactory. What the great combination, Society, has to do is to see that these minor combinations are not turned to evil account, and, by the dissemination of knowledge, to prevent unnecessary and injurious strikes. *All* strikes and combinations, then, are not unjustifiable, but, *quoad* the "Discharge Note," would be considered so. The more we think of the matter, the more thoroughly do we feel convinced that the operatives will never accept the proposed note; and we earnestly exhort the Builders' Association to withdraw it at once, before bad feeling be engendered and money wasted. We agree with their secretary in hoping sincerely that some means may be adopted, arbitration or otherwise, to adjust differences between capital and labour, and prevent the occurrence of strikes, with their fearful accompaniments of poverty, demoralization, and not seldom death.

* The following, as we understand, is the present form of the resolution come to by the "General Builders' Association":—

"That with a view to counteract the evils resulting both to masters and operatives from unjustifiable strikes and combinations, the following plan be adopted:—That on and after the 1st day of January, 1865, every member of this Association shall, upon paying off any operative, deliver him a discharge-note (in form to be supplied by the committee), which shall state the man's name, and shall be signed by or for the master. That each member of the Association pledges himself not to take into his employ any operative who (having previously worked for a member of this Association) does not first produce and deliver to his proposed employer his former discharge-note, or, in case of its loss, the name and residence of his previous employer, for reference."

OBSTRUCTION OF LIGHT AND AIR.

A CASE was tried lately in the Court of Common Pleas, Westminster, before Chief Justice Erle, a report of which may be useful to some of our readers. It was an action for the obstruction of an ancient window in a room built out at the back of the house No. 9, George-street, Hanover-square. The house belongs to Mr. Dodson (the plaintiff), who is one of the members of Parliament for the county of Sussex. This room and window had existed upwards of fifty years. It had been used as a library by Sheridan, who had written his plays in it. Dr. Pearson had lectured in it on medical subjects more than twenty years ago. Artists had used it for a studio; and for the last sixteen years it has been used by Miss Pace as a workroom for the young ladies in her millinery establishment. The window looked north, across the back yards of the adjoining houses in George-street, with

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stood (what the result of this trial confirms), that in law the 45° theory has no weight. The real question always is with the jury, has sufficient light been obstructed to make the room less valuable than it was before for a purpose to which it has been applied for twenty years? In the case of a special adaptation to a purpose for any shorter period, damages cannot be recovered for a deprivation of light which would reduce the room to its previous condition as to light. To put a case: if a room, used for twenty years for ordinary purposes, be appropriated for part of this time, because of its unusually good light, say to some artistic purpose, an obstruction which unfitted it for this purpose could not be prevented; but if it injuriously affected the room for its older purpose, the judge would have to direct a verdict for its abatement. The condition of the law in respect of light and air is not satisfactory, but improvement is not easy. It has been contended, that persons wishing to raise buildings or cover their own land, should have power to do so by compensating in money to an extent to be settled by a proper tribunal for any injury done to neighbour's rights; but it may be fairly asked in reply, Why should the adjoining owner be forced to sell that which he wishes to retain? Why should a rich and powerful man be permitted to buy up and override his perhaps poorer and weaker neighbour?

MEMORIAL SCULPTURE.—A marble bust of the late Duke of Richmond has been placed in the Assembly-room, at the County Hall, Lewes, under the personal superintendence of the sculptor, Mr. F. M'Dowell.

THE MANUFACTURE OF PERFUMES.

HORTICULTURAL SOCIETY.

AMONGST the popular lectures which have been lately delivered in the Conservatory, Mr. Septimus Piesse has given one on "Perfumes and the Methods of obtaining the Odours." The lecturer pointed out that, contrary to general belief, nearly all the perfumes derived from flowers are not made by distillation, but by the processes of *enfleurage*, or inflowering, and by maceration or infusion. The odours of flowers do not, as a general rule, exist in them as a store or in a gland, but they are developed as an exhalation. While the flower breathes, it yields fragrance; but kill the flower, and fragrance ceases. It has not been ascertained when the discovery was made of condensing, as it were, the breath of the flower during life: what we know now is, that if a living flower be placed near to butter, grease, animal fat, or oil, these bodies absorb the odour given off by the blossom, and in turn themselves become fragrant. If we spread fresh unsalted butter upon the inside of two dessert-plates, and then fill one of the plates with gathered fragrant blossoms of clematis, covering them over with the [illegible]

looked upon as an extra crop, growing as they do under the orange and lemon trees. The kind grown is the double Parma. About twenty-five tons weight of violet-blossoms are produced annually at Nice.

In France, the commerce in perfumes has risen to the annual value of 3,000,000*l.* sterling.

THE EMPLOYMENT OF YOUNG CHILDREN IN DANGEROUS MANUFACTORIES.

A SAD case, which clearly shows the necessity for interference with the manner in which the health and lives of children are risked, has just been brought under the public notice. The facts, as they were laid before the coroner's jury, are briefly as follow:—At a match manufactory in Stratford New Town, an explosion took place which destroyed the life of a boy twelve years of age, blew out the windows, and did other damage to the premises. Philip Debor, a German, who was the manager of the match manufactory, said Vesuvian lights were being made with a compound of gum, phosphorus, nitre, chloride of potash, Venetian red, and plaster of Paris. [A potent chemical brewing to be allowed to be made in an inhabited neighbourhood!] Witness had to dip the wood for the Vesuvians into it. He gave the stick to the boy, and said to him, "You stir him von leetle bit." He turned round to go into the factory, and before he got two steps the whole affair blew up; the stuff struck him on the back; the windows were blown in; and on looking he saw deceased lying on the ground all in a blaze. In Germany, he said, boys were not employed to stir the composition or turn the frame; but it was usual to employ them in England. Old men are employed in some manufactories; but he supposed that children were cheaper, and "competition is keen." This was the main evidence.

It transpired that the superintendent of the laboratory was a *military* gentleman. We should have thought that a *chemical* superintendent would have been the most fit for this office. It is to be feared, however, that neither the one nor the other will prevent the employment of very young children in this description of work until fresh powers of interference are given. In this case alone there are fifteen children employed, deceased having been the oldest.

There is one thing, however, which can now be done, after a grace of twenty years which has been allowed for the removal of dangerous trades from populous neighbourhoods: they can now be legally removed; and this is necessary for the public protection.

In the present case of death, the jury, after recording the especial cause, said they considered that the manufacturer was open to censure for entrusting such combustible materials to children of so young an age, and they recommended that [illegible] future chloride of potash should be [illegible]ith water, and so rendered non-explo[illegible]re being mixed with the other ingre[illegible] the composition.

[illegible] the jury have done their duty; but no [illegible] consequences worth naming will result [illegible] verdict. No doubt the parents of the [illegible] child are poor people, and compara[illegible]lpless. Many, however, think that if [illegible]es of this description were brought for [illegible]tion into the courts of law, damages [illegible] awarded which might be the means [illegible]lly stopping this wrong and careless [illegible]human life.

SCOTTISH MEMORIAL OF THE PRINCE CONSORT.

[illegible]signs sent in are now open for inspec[illegible]e National Gallery at Edinburgh.

[illegible] Design by Mr. Robert Matheson, is [illegible]ue equestrian statue of the Prince in [illegible]he new General Post-office, on a pedes[illegible]o stages; one enriched by bas-reliefs, [illegible]ther by allegorical figures.

[illegible] by Mr. J. Noel Paton, takes the form [illegible]morial cross." The first stage of the [illegible]is a platform of large dimensions and [illegible] of six steps. From the base rises a [illegible]ntral shaft for the support of a statue [illegible]ace, and at the angles of this shaft are [illegible]h foriated capitals.

[illegible] is a temple, by Mr. J. T. Rochead, [illegible] and Mr. J. Steel, sculptor, Glasgow. [illegible]n is elaborate, and consists of numer[illegible]

[illegible] by Messrs. William Slater and R. Herbert Carpenter, London, is an ornamented Gothic cross of three open stages. The lower compartment of the structure is occupied by a statue of the Prince.

Nos. 9 and 10, by Mr. D. Milne Holme, of Milne Graden, Berwickshire, are granite obelisks, and are illustrated by numerous drawings and two models. The obelisks are proposed to be 170 ft. in height, and in the base a chamber is formed to contain a statue of the Prince.

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As the carpenters and joiners of Birmingham have been the first to take action in opposition to the discharge-note, and no doubt before long the whole of the various branches of the building trades will be drawn up in battle array against the proposed system; we therefore pledge ourselves and call upon all who are employed in the building trade to organize themselves and assist by contributions those who are or may be on strike until the withdrawal by the Association of the discharge-note."

Besides the statement from the secretary of "The General Builders' Association," and the communications from two builders, printed in our last, we have received several angry letters, from master builders in the Midland Counties, reprimanding us for not advocating the acceptance of the "Discharge Note" by the men, and calling upon us (one with a childish threat), immediately to retract the opinion we had expressed. On the other hand, two very respectable members of the Builders' Association, of course in a quite different tone, inform us that they see they are asking for a power they ought not to have; and moreover one they are not likely to get,—at any rate, without a long and costly struggle; and have determined on not striving for it with their men.

We have been sneered at in St. Martin's Hall, and yelled at in Smithfield, when, in times gone by, we had expressed opinions adverse to unwise and unjust steps taken by the operatives; and our course was as much affected by those thoughtless demonstrations as it will be by the master builders' letters now,—that is, not at all. We can fully appreciate and lament the injury inflicted on the masters by acts of the trade unions, and the poverty and demoralization often resulting to the men themselves; but we cannot think that the "Discharge Note" will prove the remedy. The Resolution of the masters * sets forth that the determination to require the production of the "Discharge Note" from a workman before taking him on is come to with a view to counteract "the evils resulting, both to masters and operatives, from unjustifiable strikes and combinations." It is to be effective, however, in the case of *all* strikes, and all strikes and combinations are not unjustifiable, as the masters of course admit by themselves combining, as they have a perfect right to do. Combination is the secret of the day: men combine that they may enjoy a fine house in Pall-mall, instead of uncomfortable lodgings; we combine to insure; we combine in companies "limited" to trade; the lawyers combine in Chancery-lane, the architects in Conduit-street, and the trades in every town. Men in all positions "strike," too, if the terms of employment cease to be satisfactory. What the great combination, Society, has to do is to see that these minor combinations are not turned to evil account, and, by the dissemination of knowledge, to prevent unnecessary and injurious strikes. *All* strikes and combinations, then, are not unjustifiable, but, *quoad* the "Discharge Note," would be considered so. The more we think of the matter, the more thoroughly do we feel convinced that the operatives will never accept the proposed note; and we earnestly exhort the Builders' Association to withdraw it at once, before bad feeling be engendered and money wasted. We agree with their secretary in hoping sincerely that some means may be adopted, arbitration or otherwise, to adjust differences between capital and labour, and prevent the occurrence of strikes, with their fearful accompaniments of poverty, demoralization, and not seldom death.

* The following, as we understand, is the present form of the resolution come to by the "General Builders' Association";—

"That with a view to counteract the evils resulting both to masters and operatives from unjustifiable strikes and combinations, the following plan be adopted:—That on and after the 1st day of January, 1865, every member of this Association shall, upon paying off any operative, deliver him a discharge-note (in form to be supplied by the committee), which shall state the man's name, and shall be signed by or for the master. That each member of the Association pledges himself not to take into his employ any operative who (having previously worked for a member of this Association) does not first produce and deliver to his proposed employer his former discharge-note, or, in case of its loss, the name and residence of his previous employer, for reference."

OBSTRUCTION OF LIGHT AND AIR.

A CASE was tried lately in the Court of Common Pleas, Westminster, before Chief Justice Erle, a report of which may be useful to some of our readers. It was an action for the obstruction of an ancient window in a room built out at the back of the house No. 9, George-street, Hanover-square. The house belongs to Mr. Dodson (the plaintiff), who is one of the members of Parliament for the county of Sussex. This room and window had existed upwards of fifty years. It had been used as a library by Sheridan, who had written his plays in it. Dr. Pearson had lectured in it on medical subjects more than twenty years ago. Artists had used it for a studio; and for the last sixteen years it has been used by Miss Pace as a workroom for the young ladies in her millinery establishment. The window looked north, across the back yards of the adjoining houses in George-street, with little or no interruption as far as Maddox-street, and the light admitted through it was sworn to have been extremely good, and to have enabled Miss Pace to carry on her business, to match ribbands, and to work to a late hour. But in the course of this year the defendant (Mr. Cowland), who occupies No. 10, George-street, and whose back yard is immediately north of the window, put up a new building covering the whole of his back yard, except a space of the length of the window in dispute, and about 6 ft. wide, which was left unoccupied. The walls of his building were of such a height as to leave unobstructed the light coming to the window at an angle of 45 degrees to the horizon.

On the part of the plaintiff, Mr. Penfold and others gave evidence that light was obstructed, as did the tenant and some of her workpeople, to the effect that colours could not now be matched in the room as was formerly the case.

Mr. C. Barry, for the defendant, deposed that the new building was placed at such a distance (6 ft.) as to allow the light to the bottom of the window at an angle of 43°, and expressed his opinion that amongst the profession generally the admission of light at an angle of 45° was considered to suffice to prevent opposition. Mr. H. Currey and others concurred in this evidence. Stress was laid on the fact that, to allow of the erection of the new building, trees which had formerly obstructed the light, had been cut down, so that the room, it was asserted, was as light as ever.

The jury found a verdict for the plaintiff. The mode of obviating the evil has now to be settled, perhaps with fresh litigation.

It is desirable that it should be clearly understood (what the result of this trial confirms), that in law the 45° theory has no weight. The real question always is with the jury, has sufficient light been obstructed to make the room less valuable than it was before for a purpose to which it has been applied for twenty years? In the case of a special adaptation to a purpose for any shorter period, damages cannot be recovered for a deprivation of light which would reduce the room to its previous condition as to light. To put a case: if a room, used for twenty years for ordinary purposes, be appropriated for part of this time, because of its unusually good light, say to some artistic purpose, an obstruction which unfitted it for this purpose could not be prevented; but if it injuriously affected the room for its older purpose, the judge would have to direct a verdict for its abatement. The condition of the law in respect of light and air is not satisfactory, but improvement is not easy. It has been contended, that persons wishing to raise buildings or cover their own land, should have power to do so by compensating in money to an extent to be settled by a proper tribunal for any injury done to neighbour's rights; but it may be fairly asked in reply, Why should the adjoining owner be forced to sell that which he wishes to retain? Why should a rich and powerful man be permitted to buy up and override his perhaps poorer and weaker neighbour?

MEMORIAL SCULPTURE.—A marble bust of the late Duke of Richmond has been placed in the Assembly-room, at the County Hall, Lewes, under the personal superintendence of the sculptor, Mr. F. M'Dowell.

THE MANUFACTURE OF PERFUMES.

HORTICULTURAL SOCIETY.

AMONGST the popular lectures which have been lately delivered in the Conservatory, Mr. Septimus Piesse has given one on "Perfumes and the Methods of obtaining the Odours." The lecturer pointed out that, contrary to general belief, nearly all the perfumes derived from flowers are not made by distillation, but by the processes of *enfleurage*, or inflowering, and by maceration or infusion. The odours of flowers do not, as a general rule, exist in them as a store or in a gland, but they are developed as an exhalation. While the flower breathes, it yields fragrance; but kill the flower, and fragrance ceases. It has not been ascertained when the discovery was made of condensing, as it were, the breath of the flower during life: what we know now is, that if a living flower be placed near to butter, grease, animal fat, or oil, these bodies absorb the odour given off by the blossom, and in turn themselves become fragrant. If we spread fresh unsalted butter upon the inside of two dessert-plates, and then fill one of the plates with gathered fragrant blossoms of clematis, covering them over with the second greased plate, we shall find that after twenty-four hours the grease has become fragrant. The blossoms, though separated from the parent stem, do not die for some time, but live and exhale odour, which is absorbed by the fat. To remove the odour from the fat, the fat must be scraped off the plates and put into alcohol: the odour then leaves the grease and enters into the spirit, which thus become "scent," and the grease again becomes odourless.

The flower farmers of the Var follow precisely this method on a very large scale, making but a little practical variation, with the following flowers—rose, orange, acacia, violet, jasmine, tuberose, and jonquil.

The commercial importance of this branch of perfumes may be indicated by the quantity of flowers annually grown in the district of Cannes. Flower harvest: orange blossoms, 1,475,000 lb.; roses, 530,000 lb.; jasmine, 100,000 lb.; violets, 75,000 lb.; acacia, 45,000 lb.; geranium, 30,000 lb.; tuberose, 24,000 lb.; jonquil, 5,000 lb. The quantity produced at Nice has not been ascertained; with violets and orange there are more, but with cassie less than here stated.

The market season for orange-flowers at Nice lasts for more than a month, as an average, and during that time there are sold about fifteen to eighteen tons of flowers daily! and a ton of flowers will yield more than a kilogramme of otto (say forty ounces), worth 20*l.* sterling; and the residuary water, highly saturated with odour, is worth another 10*l.* note.

A surface of land, equalling an acre of planting, yields a hundred and eighty to two hundred pounds weight of flowers, valued as an average at two francs the pound. Violets may always be looked upon as an extra crop, growing as they do under the orange and lemon trees. The kind grown is the double Parma. About twenty-five tons weight of violet-blossoms are produced annually at Nice.

In France, the commerce in perfumes has risen to the annual value of 3,000,000*l.* sterling.

THE EMPLOYMENT OF YOUNG CHILDREN IN DANGEROUS MANUFACTORIES.

A SAD case, which clearly shows the necessity for interference with the manner in which the health and lives of children are risked, has just been brought under the public notice. The facts, as they were laid before the coroner's jury, are briefly as follow:—At a match manufactory in Stratford New Town, an explosion took place which destroyed the life of a boy twelve years of age, blew out the windows, and did other damage to the premises. Philip Debor, a German, who was the manager of the match manufactory, said Vesuvian lights were being made with a compound of gum, phosphorus, nitre, chloride of potash, Venetian red, and plaster of Paris. [A potent chemical brewing to be allowed to be made in an inhabited neighbourhood!] Witness had to dip the wood for the Vesuvians into it. He gave the stick to the boy, and said to him, "You stir him von leetle bit." He turned round to go into the factory, and before he got two steps the whole affair blew up; the stuff struck him on the back; the windows were blown in; and on looking he saw deceased lying on the ground all in a blaze. In Germany, he said, boys were not employed to stir the composition or turn the frame; but it was usual to employ them in England. Old men are employed in some manufactories; but he supposed that children were cheaper, and "competition is keen." This was the main evidence.

It transpired that the superintendent of the laboratory was a *military* gentleman. We should have thought that a *chemical* superintendent would have been the most fit for this office. It is to be feared, however, that neither the one nor the other will prevent the employment of very young children in this description of work until fresh powers of interference are given. In this case alone there are fifteen children employed, deceased having been the eldest.

There is one thing, however, which can now be done, after a grace of twenty years which has been allowed for the removal of dangerous trades from populous neighbourhoods: they can now be legally removed; and this is necessary for the public protection.

In the present case of death, the jury, after recording the especial cause, said they considered that the manufacturer was open to censure for entrusting such combustible materials to children of so young an age, and they recommended that in future chloride of potash should be melted with water, and so rendered non-explosive before being mixed with the other ingredients of the composition.

So far the jury have done their duty; but no practical consequences worth naming will result from this verdict. No doubt the parents of the deceased child are poor people, and comparatively helpless. Many, however, think that if a few cases of this description were brought for consideration into the courts of law, damages would be awarded which might be the means of partially stopping this wrong and careless waste of human life.

THE SCOTTISH MEMORIAL OF THE PRINCE CONSORT.

THE designs sent in are now open for inspection in the National Gallery at Edinburgh.

No. 22. Design by Mr. Robert Matheson, is for a bronze equestrian statue of the Prince in front of the new General Post-office, on a pedestal of two stages; one enriched by bas-reliefs, and the other by allegorical figures.

No. 23, by Mr. J. Noel Paton, takes the form of "a memorial cross." The first stage of the structure is a platform of large dimensions and composed of six steps. From the base rises a square central shaft for the support of a statue of the Prince, and at the angles of this shaft are pillars with floriated capitals.

No. 49 is a temple, by Mr. J. T. Rochead, architect, and Mr. J. Steel, sculptor, Glasgow. The design is elaborate, and consists of numerous parts.

No. 7, by Messrs. William Slater and R. Herbert Carpenter, London, is an ornamented Gothic cross of three open stages. The lower compartment of the structure is occupied by a statue of the Prince.

Nos. 9 and 10, by Mr. D. Milne Holme, of Milne Graden, Berwickshire, are granite obelisks, and are illustrated by numerous drawings and two models. The obelisks are proposed to be 170 ft. in height, and in the base a chamber is formed to contain a statue of the Prince.

No. 21, bearing the motto, "The memory of the just is blessed," is a square tower, rising to a height of 380 ft., and resembling in outline the clock-tower of Westminster.

Nos. 24 and 25, designs, and model No. 53, illustrate design, accompanied by a model, by Mr. W. Calder Marshall. Mr. W. Calder Marshall has chosen as its main feature a Venetian shaft or column of polished red granite, surmounted by a statue of the prince, with a foliated capital, and a base illustrated by allegorical figures, in two stages, the first series being seated on projected pedestals, and the second,—like the first, four in number,—standing around the shaft. The lower series appears to represent those arts, and the upper those virtues, which may be held to be peculiarly associated with the career of the illustrious personage whose effigy surmounts the column.

In No. 34, Mr. David Bryce proposes to commemorate the Prince by the erection of a great tower, or keep, on the Castle Rock, to be called the Albert Keep. It is proposed that in its interior should be a hall, specially appropriated to a statue of the Prince, so that the building might, in all time coming, be associated with his memory.

Mr. John Steell sends three designs, one a drawing (No. 38) for a pedestrian statue, and two rough models, or rather sketches, in plaster, for equestrian statues. In the drawing, the Prince is represented as contemplating a globe, which he holds in his hand, with reference to his project of an International Exhibition, the pedestal being ornamented with allegorical figures of Manufacture, Art, Science, and Religion.

No. 39, a design by Mr. David Rhind, is for a memorial column. The base is made ornate with bas-relief and sculpture; the capital breaks into Gothic pinnacles; the whole being surmounted with a statue.

Mr. Cousin's design and that of Mr. Joseph Durham, we have already described.

ART-WORKMEN AND THE SOCIETY OF ARTS.

LAST Monday evening, the art-workmanship competitors met the council and other members of the Society of Arts, and talked over the terms of the present competition, with the view of learning if they were satisfactory. The general inference to be drawn from the conversation was, that little alteration was desirable. No adjudication has yet been made. The council have invited the same three gentlemen who acted last year as judges, to serve again in that capacity,—Mr. John Webb, Mr. M. D. Wyatt, and Mr. R. Redgrave. The exhibition of the works sent in continues open. Amongst the wood-carvers, Mr. Gerard Robinson occupies a prominent place from the variety he exhibits. "Hope for the Future," a child's head, by Mr. Wallis, is a charming work. "Cain preparing his Sacrifice" (91), James Griffiths, is well intended. A pair of carved frames, G. Bull, and a fruit panel, W. Taylor, show skill. Mr. Baylis's ink-stand will not escape notice. Mr. G. Lock exhibits a double festoon of flowers (90), excellently carved in parts. The carvings in marble are very indifferent. Of the three stone brackets we prefer No. 8, by Leon. The *repoussé* work in metal, by Septimus Beresford (15) and H. R. Batchelor, is very creditable. There is an excellent piece of chased ornament in bronze by H. J. Hatfield, and a good engraving on silver by Gilles Mackenzie (34). The wall mosaics give hope, and we may say the same thing of the specimens of gem engraving, an art sadly neglected in this country.

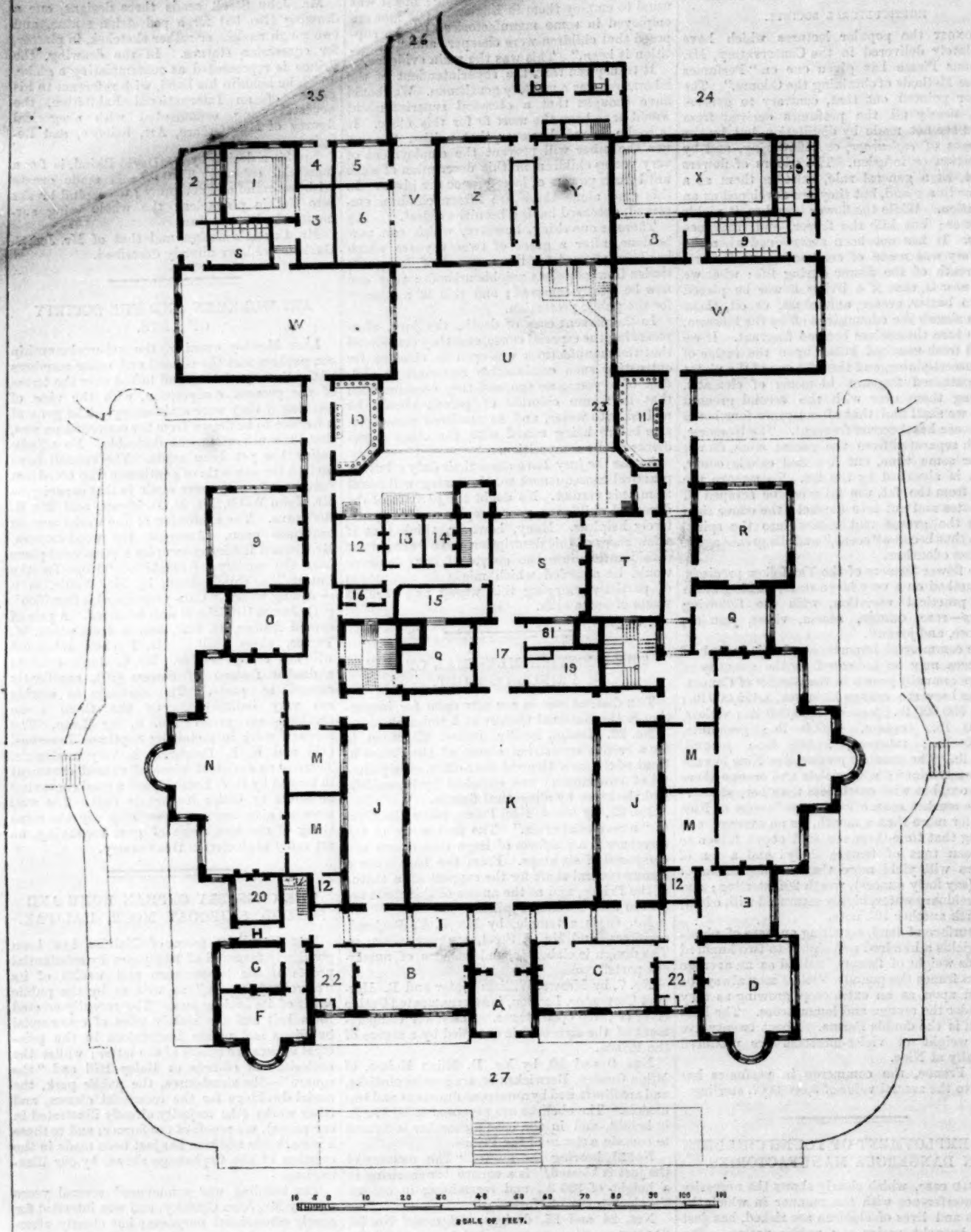
THE CROSSLEY ORPHAN HOME AND SCHOOL, SKIRCOAT MOOR, HALIFAX.

THE Yorkshire town of Halifax has been peculiarly favoured of late years by substantial proofs of the benevolence and wealth of its "merchant princes," as well as by the public spirit of its leading men. The recently-erected town hall and the stately piles of commercial buildings and public institutions in the principal streets are proofs of the latter; whilst the ecclesiastical edifices at Haley Hill and "the square"—the almshouses, the public park, the model dwellings for the industrial classes, and other works (the majority already illustrated in our pages), are proofs of the former; and to these a remarkable addition has just been made in the erection of the Orphanage shown by our illustrations.

The building was commenced several years ago, by Mr. John Crossley, and was intended for purely educational purposes; but shortly afterwards the scheme was abandoned and the works were stopped. In 1861, the firm of Messrs. John Crossley & Sons (consisting of Mr. John Crossley, Mr. Joseph Crossley, and Sir Francis Crossley, bart.), determined to complete the structure, and adapt it to the purposes of an orphan institution. They entrusted the work to Messrs. Paull & Ayliffe, of Manchester. Active operations were resumed three years ago, and have just been brought to a successful conclusion.

The exterior of the building was carried up to the first-floor before the suspension took place. The architects of the Orphanage had therefore to make the best of existing arrangements, and to adapt the exterior treatment to the portions already erected. Internally, little except the enclosure walls of the main structure was retained. The buildings in the rear are wholly additional, and the space now occupied by the dining-hall, &c. was completely cleared and re-arranged.

The whole of the masons' and joiners' works,



THE CROSSLEY ORPHANAGE, HALIFAX.—*Ground Plan.*

and nearly all the works connected with other trades, have been executed by "day-work," under the superintendence of the architects and the clerk of works, and the entire building is spoken of as a good specimen of materials and workmanship in every department.

Accommodation is provided for 450 children, viz., 200 boys, 200 girls, and 50 infants. The cost may be stated in round numbers to be 50,000*l.*, exclusive of land. The clerk of works was Mr. Gregory Gill.

The building stands on the crown of Skircoat Moor, about a mile from the town, and in the same vicinity as the residences of Mr. John Crossley and Mr. Joseph Crossley.

REFERENCES TO PLAN.

A. Vestibule.*
B. Waiting-room.
C. Museum.
D. Committee-room.
E. Junior Master's Room.
F. Master's Drawing-room.
G. Master's Dining-room.
H. Entrance to Master's House.
I. Corridor.
J. Open Area.
K. Dining-hall.
L. Boys' School-room.
M. Class-room.
N. Girls' School-room.
O. Matron's.
P. Infants' Day-room.
Q. Cloak-room.
R. Boys' Workroom.
S. Kitchen.
T. Scullery.
U. Open Court.
V. Covered Way.
W. Play-room.
X. Swimming-bath.
Y. Laundry.
Z. Washhouse.
1. Girls' Bath.
2. Girls' Convenience.
3. Dressing-stage.
4. Tool-house.
5. Stable.
6. Carriage-shed.
7. Drying-closet.
8. Dressing-stage.
9. Boys' Conveniences.
10, 11. Lavatories.
12. Servants' Hall.
13. Cook's Room.
14. Steward's Office.
15. Kitchen Dry-stores.
16. Dirty-linen Closet (shoot from Dormitories).
17. Serving-room.
18. Bread-room.
19. Crockery-store and Wash-up.
20. School Mistresses' Room.
21. School-store Closet.
22. Retiring-rooms.
23. Underground Passage from Boiler-room to Basement Heating Apparatus.
24. Girls' Playground.
25. Boys' Playground.
26. Back road for Carts, &c.
27. Terrace.

* The columns at entrance have been accidentally omitted in plan.

THE CROSSLEY ORPHAN HOME AND SCHOOL, HALIFAX, YORKSHIRE.—MESSRS. PAULL & AYLIFFE, ARCHITECTS.

THE LONDON AND GENERAL WATER-PURIFYING COMPANY.

EVERY one knows that under present arrangements, in proportion as our towns become properly drained, the pollution of our rivers is increased. Such is the magnitude of this evil with respect to the Thames, that notwithstanding the enormous outlay made of late years in providing filter-basins to purify the water taken from the Thames by the Metropolitan Water Companies, the water delivered is little if any purer now than it was in 1851. It holds in suspension both mineral and organic, as well as other impurities, which must remain to be separated by domestic filtering. The cistern-filter of Mr. F. H. Danchell, which is well spoken of, has recently become the property of a company, under the presidency of Viscount Ingestre, a nobleman who has largely interested and successfully exerted himself in the promotion of sanitary reform. The operation of Danchell's cistern-filter is both mechanical and chemical: there is a large bulk of animal charcoal used for purifying the water; and, by the means of disengaging mechanical impurities by ascension, whereby they are, for the most part, separated without entering the filtering matter at all, the filter it may be expected will remain in good working order for a great length of time, whilst the charcoal is easily renewed when necessary. By this means the Danchell filter is free from the common objection to ordinary filters, which, being easily clogged, require to be frequently cleansed; and being self-acting, it is moreover rendered independent of the attention of domestic servants, who, it is well known, will evade, if they can, the tedious operation of filling into the filter all the water to be purified. Again, the water is purified just at the moment it is wanted, so that impurity that follows upon stagnation is entirely obviated.

WELLS.*

THE art of well-sinking is common to all countries, and was probably one of the earliest artificial means adopted to furnish a supply of water. From the earliest periods of history the records of both sacred and secular writ go to prove that the art was pursued alike by the savage who roamed the desert and the citizen who inhabited the town; yet it should be here observed that there is a marked difference between the mere hole the savage may scratch in the sand, and the highly-finished wells of some Eastern cities. So ancient are wells that Ewbank observes they must have been of antediluvian origin; and that such useful works remain long after the destruction of those more splendid edifices that have been erected more for the glory than the usefulness of mankind. The buried cities of Nineveh, Herculaneum, and Pompeii, abound in wells of excellent construction, containing good water, and which at the present day supply the inhabitants living in those localities. It is probable that the first wells were shallow holes excavated in the loose soil in moist places, such as are found at the present day to be executed by uncultivated or uncivilised nations or tribes. After the discovery of the metals, which is supposed to have taken place in the seventh generation, as Ewbank observes, rock and indurated strata no longer offered an impediment to the well-sinker, and, consequently, wells were sunk to greater depth in such strata. As the art of well-sinking developed itself at an extremely early period, and long anterior to the commencement of history, no very great advance has been made in it; indeed, the mode usually adopted at the present day when sinking wells to great depth in loose strata, by first forming a curb on which the ordinary steining is placed, and which settles down as the work of excavation is carried on within, and thereby preventing the loose soil falling into the well, was practised ages ago in sinking wells in the East; and from them we have copied the mode in more modern times. Wells of excellent construction abound in Hindostan, China, Japan, Tartary, Egypt, and elsewhere. When the British took possession of Hindostan, the number of wells in use in that country was estimated at 50,000. Many of the ancient wells were of great depth. The wells of Cabul are from 300 ft. to 350 ft. deep, and many of them are but 3 ft. in diameter. The famous well at Tyre is said to be 630 fathoms in depth. Jacob's well, at Samaria, is 105 ft. deep and 9 ft. diameter. The well Zem-Zem, at Mecca, is 210 ft. deep, and that of Joseph, at Cairo, 300 ft. deep. This well of Joseph is a fine example of the skill and boldness of design of the well-sinker. Although called after Joseph by the Arabs, it is by no means of so ancient a date as the name would imply; for the well was probably sunk about 700 or 800 years ago, but by whom is a disputed point; some attributing it to a vizier of the name of Joseph, others to Saladin, the intrepid defender of his country, whose name was Yussef (Joseph). The well consists of two shafts, one above the other, but not in the same vertical line. The upper shaft is an oblong excavation, 24 ft. by 18 ft., and 165 ft. deep, descending into a large and capacious chamber, in the floor of which is constructed a basin or reservoir for containing water that is raised from the lower shaft. In this chamber a lower shaft is sunk, which is an excavation 15 ft. by 9 ft., and 130 ft. deep. Round the upper shaft a spiral passage, 6 ft. 4 in. wide and 7 ft. 2 in. high, is cut, separated from the well by a partition wall of the solid rock, only 6 in. in thickness, through which loopholes are pierced for lighting the passage. This passage is made use of by parties who draw water, and also for the descent of mules or other animals that are employed in the large chamber below, to give motion to a system of chain-pots by which the water is raised from the lower shaft and poured into the basin in the chamber. There is also a spiral passage round the lower shaft, but it is not inclosed from the well, as in the case of the passage round the upper shaft. The water of this well is procured from a bed of gravel, after penetrating the strata to the depth before mentioned. Wells are common in Greece, and in the olden times of its classic glory were the places of public resort: just as in modern times men congregate at their clubs and such like places, so did the sage Athenians meet together at their wells, and at them orators declaimed, and the music and dance lent their charm to make them places of pleasure and amusement.

The Romans had a clear knowledge of the art of well-sinking; and wells executed by this people are found in every country they once possessed. Many of the successes of their arms were due to their knowledge in this branch of engineering, as when every other source of water failed or was cut away by their enemies, they had recourse to well-sinking to obtain their supply. It was the knowledge of well-sinking that enabled Cæsar to retain Alexandria when all the water of the cisterns had been spoiled by the Egyptians. The same knowledge enabled Pompey to procure a supply of water when holding a position of great advantage against Mithridates, who had abandoned it for want of water. Imperial Rome (prior to the time of Appius Claudius) was supplied with water principally from wells.

The water procured from wells is rain that has descended by the minute interstices of the earth's crust, and is stored in the numberless interstical spaces of porous strata.

Wells may be classified under two heads, viz.:—*Ordinary Wells*, or those sunk into permeable or water-bearing strata; and *Artesian Wells*, or those sunk or more generally bored through impermeable strata until a water-bearing stratum is tapped, when the water is forced upwards by virtue of the hydrostatic pressure due to the superior level at which the meteoric water was received.

Ordinary Wells may be again classed under the respective heads of *Shallow* and *Deep Wells*. The water from both classes is procured under precisely the same circumstances, but differs often very materially in quality and quantity.

Shallow Wells include ordinary domestic wells sunk a few feet into the permeable strata of the earth's crust, and, owing to their shallowness generally, only catch the adjacent percolating water: consequently cannot be depended upon to give a large supply; and, inasmuch as they are generally contaminated with the contents of sewers and cesspools when sunk in the superficial deposits under cities and towns, which are honeycombed with such offensive receptacles, or tunnelled with imperfect and leaking sewers, their waters are not to be recommended for general use.

Deep Wells sunk into permeable and water-bearing strata derive supply from a more remote and extensive drainage area brought into action by the depth given to the wells, and the quantity yielded by them is limited by the friction of the water in passing through the interstitial space and the molecular attraction of the strata for retaining the water, which practically limits the area draining into the well.

Artesian Wells have ages ago been in use, and the antiquity of boring wells of this class is so great that the precise period of their introduction is unknown. They are common to Syria and Egypt. China abounds with them, many being upwards of 1,800 ft. deep and but 6 in. in diameter. They are common in Italy and France; and in the province of Artois, of the latter country, they are so abundant that one may be found at nearly every door; and it is from this province that the art of sinking or boring such wells came into this country, and they are named by us after that place. Artesian wells are artificial springs, and the same remarks that apply to deep-seated springs will apply to Artesian wells.

The quantity of water yielded by wells cannot be absolutely computed, as it is dependent upon so many varying circumstances; but in considering this part of the question we must have regard to the area of drainage, the nature of the stratum, its dip, strike, faults, absorbent properties, and the nature of the underlying and overlying strata, the rain-fall, and the depth of the well itself.

The theory of the probable quantity of water yielded by wells is called the cone theory, *i.e.*, the drainage area contributing to the supply of a well is represented by an inverted cone, the apex of which is at the bottom of the well; so that if the strata were perfectly uniform, and the flow through it equable, the quantity yielded by wells sunk to various depths would be represented by the area of the different cones; but inasmuch as perfectly uniform strata of any great extent are rarely met with in nature, it is impossible to lay down any but general laws in studying the probable yield of water by wells.

Physical Properties of the Strata.—The yield of water from a well depends upon the nature of the strata: thus, if the strata be of a close texture, having but few and small interstical spaces, the drainage area will be limited by the friction of the water in flowing through them, and by their capillary attraction; consequently, in strata of this character, the area contributing to the supply of a well will be represented by an inverted cone of acute irregularity; while, on the other hand, if the strata have large and numerous interstical spaces, they will yield water rapidly, and the area contributing to supply such well becomes practically infinite. And just in proportion as strata approach one or other of the descriptions of the strata mentioned (all other things being equal), so will the supply of water capable of being procured from wells sunk into them vary. The construction of a well will also influence the flow of water; as, for instance, when a well is sunk into dense but permeable strata, containing much water, naturally yielding it slowly, owing to the fineness of the interstices; by special arrangement an increased supply could be procured. These arrangements consist generally of long tunnels or headings, driven or extending horizontally, sometimes to great distances of the shaft. They have the double advantage of not only offering a greater surface to allow of the escape of water into the well, but they also act as reservoirs for storing it, which is a great advantage in all cases, but more especially when the water is required at intervals, and not continuously. The nature, character, and position of the water-bearing strata, from which wells derive their supplies, must be carefully considered by every person who desires success to crown his labours in practising the art of well-sinking. It has been already shown, under the head of Absorption, that the quantity of water sinking deep into the ground is influenced by many circumstances, and is not alone dependent upon the character of the strata; yet it is quite obvious to the most casual observer, that the nature of the strata has the most important bearing upon the quantity and quality of water yielded by wells: thus, chalk, from its absorbent nature, has been found by observation on the steep chalk-hills around London to absorb a rainfall of two inches per hour; the red sandstone formation, under suitable circumstances, also absorbs rainfall very rapidly; while the more impervious strata absorb it but slowly. The dip or strike of the strata will also have an important bearing upon the amount of water yielded by a well, as it may occur that the natural inclination of the strata may be unfavourable to the yield of any great quantity of water in a particular locality.

Faults have a material influence upon the flow of water in the subterranean passages of the

* From paper by Mr. Baldwin Latham, upon "The Supply of Water to Towns," read at "Society of Engineers."

[illegible], and, consequently, have much to do with the amount of water capable of being yielded by wells. The level of the water in the same strata, when disjointed by a fault, is no longer the same, but may vary considerably; and it may also often happen that a well may turn out to be a failure owing to the near proximity of a fault cutting off and diminishing the drainage area. The careful study of the strata should always form an important point in considering the desirability of well-sinking, and the want of such study often entails failures which we ascribe to faults; but the probability is that, with further insight and clearer knowledge, many of these failures, which are rather the fault of the engineer than any fault in nature, would not arise. Water flowing in the bowels of the earth follows the same laws as water flowing on the surface of the earth, except when modified by some disturbing cause. The line of saturation, or the level at which water may be procured, varies in different strata, and is affected by various causes: thus, the effect of continuous pumping in a district is to lower the water-level of such district. Generally the water-level in strata has an inclination in the direction of its flow: thus it has been established by the Rev. Mr. Clutterbuck and others that the inclination of the line of saturation in the chalk in the north of London is 13 ft. per mile. In other places it varies according to circumstances: thus, it is not improbable that the flow of some intermittent springs is due to the elevation in the line of saturation, as in the Bourne at Croydon, which breaks out occasionally after very heavy and continuous rains. As a rule, it will be found that in those districts in which the flow of water from springs and the flow of rivers is equable, or neither subject to excessive floods nor droughts, but is always discharging a quantity very near the mean flow, so will it be found that wells sunk into the particular strata from which these rivers or springs derive their principal supplies will yield the largest quantity of water.

COST OF THE GOVERNMENT AIDS TO EDUCATION.

SIR DAVID BREWSTER, the principal of the University of Edinburgh, in a recent address, complains of the smallness of the sum which is yearly granted by the Government in aid of the Scottish universities. Amongst other matters bearing upon this subject, Sir David remarks, that the sums granted for Protestant middle-class education in Ireland was, during the last year,—Queen's College, 21,000*l.*; Queen's Colleges, 6,600*l.*; Queen's University, 3,608*l.*; Belfast Theological Institution, 2,700*l.*—in all, 33,908*l.* The learned principal says, "this magnificent sum is for the education of far fewer than 1,000 students; while all the universities of Scotland receive only the pauper allowance of some 10,000*l.* for the education of 3,500 students." Respecting this, "A Scotchman in London," in writing to a contemporary, remarks, that the 10,000*l.* a year, which is so little thought of, is equal to a capital of 300,000*l.* in Consols; but the above sum is additional to former grants, and last year the payments in connexion with the Scottish universities (including a special grant of 2,362*l.* for Aberdeen) were 22,267*l.*: this is about 6*l.* 10s., or in three years, 19*l.* 10s., paid by the State in assisting each student in the Scottish universities. In Ireland, the bounty granted by Parliament for each student is about 34*l.* a year, or 102*l.* in three years, the usual time for young men to remain in these colleges. We do not complain of these grants, and have only referred to them for the purpose of contrasting the extent of the Government aid afforded to the education of the poor and working classes in Great Britain. The sum granted for the common schools last year was 704,002*l.*, and the "Scotchman in London" remarks, that in a tolerably well educated country there is, or ought to be, one-sixth of the population at school. Supposing this to be the case, the Government allowance to each scholar amounts, on the average, to only about 3s. 6d. a year; or, supposing the average attendance to be three years, the total sum paid to each child will be 10s. 6d.

In Ireland, the common schools received a Parliamentary grant of 306,821*l.* One-sixth of the population of Ireland would be 950,000, representing the children who were, or who ought to be, at school; and this sum divided amongst them would average about 6s. 6d. a year for each, or 19s. 6d. in three years—about twice as much as the sum allowed for common school education in England and Scotland.

In connexion with the common schools, a payment is now made according to Mr. Lowe's plan,—not a certain sum for each scholar, but at the rate of 8s. for each child who passes a creditable examination in reading, writing, and arithmetic; and it appears that in Roman Catholic schools 21 per cent. of the children examined failed to pass their examination in reading (and consequently the school lost the offered 8s. on account of each child that so failed); 23 per cent. failed to pass their examination in writing; and 33 per cent. failed to pass their examination in arithmetic,—the average of the three branches being 25⅝ per cent. In Church of England schools 13 per cent. of the children examined failed to pass their examination in reading; 15 per cent. failed in writing; and 24 per cent. in arithmetic,—the average of the three branches being 17⅓ per cent. of failures.

In the British and Foreign Society's schools, where the education is more of a secular description,—taking the Wesleyan, Presbyterian, and other Protestant Dissenters' schools together, the results are as follow:—The failures in reading were only 10 per cent.; in writing, 12 per cent.; and in arithmetic, 19 per cent.—the average of the three branches being 13⅔ per cent. We thus find in Roman Catholic schools there are 25⅝ per cent. of failures; in Church of England schools, 17⅓ ditto; and in the British and Foreign Society's schools, 13⅔ ditto. The above figures show a marked difference, and confirm an opinion we have before expressed, that in the National schools it is necessary to direct attention more exclusively than is done at present, to the simple teaching of reading, writing, and arithmetic.

AN ILLUSTRIOUS FOREIGN VISITOR.

A VISITOR, well known and highly appreciated in many of the waters abroad, has, by the means of the Acclimatisation Society, been introduced into our own. This is a remarkable event, for it is said that there has been no new fish useful for food added to those which before existed in England since the time the carp was brought here more than 200 years ago. The present stranger is the *Silurus glanis*, specimens of which have been brought alive to the station of the Society at Twickenham by the exertions of Sir Stephen Lakeman and Mr. Lowe, from a distance of nearly 2,000 miles. In all, fourteen of these young fishes were brought from Kapochein, in Wallachia, where Sir Stephen Lakeman has an estate. The Argich river, which flows past here, abounds in these and other valuable fish, which are found more or less throughout central Europe and in Scandinavia; in the Danube and many of its tributaries the number is abundant; and in those wide waters the *Silurus glanis* is said to reach the enormous weight of 300lb. Its appearance is not pleasant, the large flattened head having a capacious mouth, which is capable of seizing the largest kind of prey; so that if this fish be successfully propagated in our streams and lakes, the pike, the water-wolf of the British waters, will meet with more than its match. The habits of the *Silurus glanis* are said to be most ferocious, and its growth, provided there be a sufficient supply of food, very rapid. The body is less elongated than the eel, and there are, stretching from the head, long tapering barbels; the eyes are frog-like, and there are many other points of general resemblance to the frog.

The new fish is like the eel in its habits, being a wallowing fish, fond of burrowing in the mud, and hiding amongst the rotten roots of trees. There are dark charges made against some of the largest specimens of the *Silurus glanis*, in the stomachs of which it is reported that portions of human bodies have been found. However, this is probably an exaggeration. There can, however, be no doubt of the extraordinary appetite and fierceness of this fish. In the floods which cover the neighbourhood of the Danube, the silurus finds a plentiful prey in the multitude of frogs which pass into the river; but at other times, fish, small animals, worms, indeed anything which comes near, afford a supply of food; and there may be fear that, notwithstanding the valuable qualities of the silurus as a means of supply to our tables, it may more than balance its value in this way by the immense destruction of fish which is needed for its support.

It is said that the silurus, when the prey is plentiful, will attain over 56 lb. in four years; and Englishmen who have tasted it report that in flavour it is superior to the salmon. An eminent authority remarks that this is the only foreign fish which it would be worth while to introduce into this country; and thinks that, into several of our lakes, particularly those in peat soil, this fish might be usefully placed. To increase the quantity and variety of the food of a nation is an indescribable advantage; and the greatest praise is due to the Acclimatisation Society for their earnest labours in this way.*

We may note that there is a sea-fish which somewhat resembles the cod; and the pike is making way as an article of food in the London market: the flavour is excellent, either when boiled, fried, or baked.

COMPETITION FOR GOVERNMENT BUILDINGS AT NELSON, NEW ZEALAND.

THE Government authorities advertised for designs for a Government House, a Supreme Court-House, and a Custom-House, with post-office combined. The cost of the first was to be 23,000*l.*, and each of the others 20,000*l.* A premium of 200*l.* was to be given for the best design of each of the three buildings, and a second premium of 100*l.* for the second best design. So far the terms of the competition were unobjectionable. The architects, however, were required to send in carefully prepared estimates with the several trades stated separately, including all fittings, the drawings being all made to a one-eighth scale, comprising plans, elevations, and sections, perspective views from two points of view being *desirable*, and models also *admissible*;—the premiated designs to become the property of the commissioners;—the architect of each of the best designs not necessarily to be employed to carry out the work; — and no *premium* to be paid until the building contracts were taken; and not claimable at all, if the building tender exceeded 15 per cent. above the architect's estimate. Notwithstanding these terms, and that an experienced architect pointed out the unreasonableness and absurdity of them in the *Nelson Examiner*, "an immense number of designs were sent in,"—from would-be architects at least; all the designs, of course, being obviously defective, and not in accordance with the conditions. Two, however, were selected, one of which it is estimated will cost 10,000*l.* above the stated amount, and the other 8,000*l.* The design selected for the first premium and for execution, is said to be in the style of a baronial residence of castellated Gothic. This building is estimated to cost 33,000*l.*; but even according to the commissioners "it may be feared that the cost will greatly exceed this amount." The second design is that of a Tudor Gothic mansion.

NEW THEATRE, BRADFORD, YORKSHIRE.

THE new theatre in Bradford was opened on the 26th ult., under the management of Mr. J. B. Buckstone, of the Haymarket, and Mr. Wilde. It has been built by a limited liability company. The building is 50 yards long, and 20 yards wide; and at the front is set back some distance from the line of road, so as to give greater facility for ingress and egress. This space will be covered with an ornamental portico or verandah, forming a desirable shelter in case of wet or inclement weather. In consequence of the inclination of the ground, the architects have been able to arrange the levels of the floor in a convenient manner. Parties visiting the boxes, obtain admission to them without the necessity of ascending a flight of steps. The boxes are entered from corridors, and are furnished with chairs, of ebonized wood, covered with crimson Utrecht velvet. There are also two private boxes on each side of the stage. The seats of the pit are comfortable, every alternate seat having a back. The gallery is approached by a stone staircase. There is also a second one, of the same size, as an extra means of egress. All the interior doors are arranged to open outwards. The proscenium is 26 ft. wide, by 27 ft. high. At the rear of the stage are suites of dressing-rooms, green-room, property-room, &c. Externally the building is somewhat plain in appearance. Internally, the fronts of the boxes and galleries (three tiers), are decorated with a wide diaper enrichment, each tier of a different design. The

* There is an account and a good engraving of the new fish in a recent number of Cassell's Family Paper.

proscenium is supported by clustered twisted columns, on each side, having a guilloche enrichment between. The top is of an elliptical form of arch, decorated; over this are the Royal arms and scroll enrichments. They are enclosed in a broken circular pediment, gilded and decorated. From the centre of the ceiling hangs a chandelier, the work of Messrs. Ostler, of Birmingham. The stage is constructed by Mr. James Neill, of Bradford, from plans furnished by Mr. J. G. Hilton, of London, and its erection has been carried out under the superintendence of Mr. Oliver Wales, of the Haymarket Theatre. The accomdation is as follows:—Pit, 600; dress boxes, 200; upper boxes, 250; gallery, 750; total, 1,800. The architects of the building are Messrs. Andrews, Son, & Pepper, of Bradford. The execution of the works has been entrusted to local tradesmen. The clerk of the works was Mr. Benjamin Roberts. The opening night was a success.

ROCKWORK.

BAD rockwork is oftener seen than good. Making some observations on the formation of such work, the *Edinburgh Courant* says:—There are two leading objects to be kept in view in the construction of artificial rockwork. One is an imitation of the surface, broken and disturbed, and intermingled with Alpine vegetation; the other an imitation of the natural stratification of some particular section of rock geologically arranged. The rockwork which most usually occurs in park scenery (we do not here refer to it as entering into combination with other objects in flower gardens), is by the sides of the approach where cuttings have to be made through rocky strata. Than this nothing is more simply accomplished, as all that is required is to bare the natural rock so as to bring into view pieces of its most perfect formation, to cover the spaces between with turf or creeping plants, and with a few stunted bushes of birch, or such other tree as is indigenous to the spot. Care must be taken that no tool-marks be left visible on the rock, and that all traces of art be obliterated, leaving the whole as if it had been a natural opening through which the road has been taken. Lay bare prominent pieces of natural rock here and there in dingles and banks near which walks or drives pass, so as to bring them into contrast with the vegetation that surrounds them, and plant with creeping plants bare and harsh lines that may have been formed by quarrying, landslips, &c. Artificial rockwork may be sometimes employed to hide objects not wished to be seen, and where the space is not sufficiently broad to admit of this being effected by planting.

THE LONDON DRESSMAKING COMPANY (LIMITED).

THE agitation of the question as to overworking, overcrowding, ill-health, and mortality amongst the poor dressmaking girls at the West-end of the metropolis has resulted in the formation of a reformative or model company under highly influential auspices. The patrons of the association are Lord Shaftesbury and the Bishops of London and Oxford, and among the patronesses are many of the leading ladies of the Ladies' Sanitary Association. The capital of the company will be 20,000*l.*, in 2,000 ten-pound shares. They have already taken offices at 19, Langham-place, and are negotiating for the purchase of a first-rate West-end dressmaking business to begin with, although there are already nearly 200 shareholders on their list. If we have any misgiving as to the result, it is not that the undertaking will be pecuniarily a profitable one. The dividends, however, are restricted to 8 per cent. per annum, and the surplus profits are to be devoted to the improvement of the condition of the poor workwomen. The hours of work are to be restricted to ten, or from 8 a.m. to 8 p.m., with two hours intervals for meals. Great exertions are still, we understand, being made to increase the list of shareholders, although the intention is only to begin on a small scale; but have the company the power even now to begin on a small scale, with 200 shareholders, patrons, —customers, in short, and a first-rate dressmaking business already established to begin with? We should think they would be overwhelmed with orders even at the very outset. This, in truth, is virtually a great West-end co-operative establishment, and it certainly sets out with the brightest of prospects and possibilities as regards material success and the amelioration of the condition of the poor needlewoman. The company have no desire to act competitively or antagonistically against the present order of dressmaking establishments, but rather to induce them to adopt those improvements as to accommodation, hours of labour, and general good treatment, of their workwomen, which it will be the aim of the company to set before them as a model.

ART-UNION OF LONDON.

CLAUDE DUVAL is the title of the print provided by the council for the subscribers of this Society for the current year, and it is incontestably one of the most interesting as well as one of the most ably engraved of the numerous fine plates produced under the auspices of this corporation. The scene depicted is one that was of no unfrequent occurrence in the days of our second Charles. Claude Duval, the dissipated foreign valet of a nobleman, took to the road, and, in the course of his campaign against the goods and chattels of the travelling community, he, on one occasion stopped a carriage which yielded booty to the amount of 400*l.* Touched, however, by the beauty of the fair mistress of the party, and with that humorous caprice, which often swayed gentlemen of his profession, the bandit contented himself with 100*l.* out of the 400*l.*, on the condition that the lady should dance a *coranto* with him on the heath. This is the moment selected by Mr. Frith for the subject of his picture. The forced gaiety of the lady, contending with the mortal fear which she cannot conceal, combined with the graceful action which bespeaks high culture,—the open-mouthed amusement of the men who evidently enjoy the joke,—and the suppressed indignation of the old man who sits bound on the ground, are all admirably given, while the negro escaping on the right-hand side, unnoticed by the gang, through their interest in the progress of the dance and the contents of the caskets, suggests the possibility of a rescue; and the gibbet in the far distance, with a Hogarthian touch, foreshadows the probable exit of some of the performers in the scene. Mr. Stocks has executed his portion of the work with great success. The laying in of the lines and their bold continuous sweep, are worthy of some of our old masters in this style, and the texture of the lady's satin dress and the robber's coat is very skilfully rendered. There is no doubt that this print must secure a very large number of subscribers anxious to possess it.

The council announce, amongst other novelties, a bust of the Prince of Wales, to pair with the one of the Princess given last year. If the likeness be as good as that of her Royal Highness, it will be a success.

We have seen a silver vase in repoussé work, executed by Mr. Barkentin, on which are given two scenes from the story of Cupid and Psyche: two nymphs very gracefully poised form the handles, and the whole thing is of good design, and a creditable specimen of an art at present much neglected. The Art-Union has bought the model and copyright, and a number of the vases reproduced by electro-deposit will be given as prizes in the next distribution.

THE ARCHITECTURAL ASSOCIATION.

THE ordinary meeting of members was held on Friday evening (the 23rd ult.), at the House, in Conduit-street. The chair was taken by the president, Mr. J. H. Christian.

The following gentlemen were elected members of the Association:—Mr. Demain, 4, Harringford-road, Barnsbury; Mr. Somers Clarke, 20, Spring-gardens; Mr. John Eastly Goodchild, jun., 8, Regent-street; Mr. Walter Evill, 27, Elgin-crescent, Notting-hill; Mr. Walter Lonsdale, 1, Horbury-crescent, Notting-hill; Mr. G. Fredk. Payne, 63, Great Queen-street, Lincoln's-inn-fields; Mr. E. J. Maddock, 9, Conduit-street; and Mr. A. Hopkins, 10, Gray's-inn-place, Gray's-inn.

The Chairman said, a letter had been received from the Science and Art Department, South Kensington, transmitting, for the information of the Association, a minute recently passed by the Lords of the Committee of Council on Education on the subject of architectural decorations.* Their lordships expressed a hope, that as the subject was one of interest, not only to the public, but especially to architects, the Department might be favoured with any suggestions which it might be in the power of the Association to afford for the promotion of the object in view. The letter in question was dated the 19th inst., and was signed by Mr. Henry Cole. The chairman added, that as some portions of the minute appeared to be extremely valuable, the better course might be to refer it to the committee.

In reply to a question,

The Chairman said, he was of opinion that the Architectural Museum should not be permanently located in so distant a place as South Kensington.

Mr. G. H. Birch then (in the absence of Mr. Bayn) read the prize essay, written by the latter gentleman, "On Iron as applied to Architecture."

On the 6th of January Mr. Lacy W. Ridge will read a paper "On Boxgrove Church, Sussex."

* This will be found in the *Builder*, p. 903; *ante*.

BUILDING NOTES AND QUERIES.

TILING.

IN the early times of periodical literature, a column of the *Tattler* or the *Spectator* was devoted to correspondence, and contained questions and answers; sometimes, no doubt, genuine and authentic, but often merely covering editorial opinions under a pseudonymous signature. Correspondence of this nature may still be traced in the columns of certain sporting papers and of journals that deal almost exclusively with some isolated department of public news. With the increase in the number of readers, and the augmented circulation and daily issue of the newspapers of a later period, correspondence entered on another phase. Too voluminous to be printed, even in abstract, the letters daily received supplied to the conductors of the daily journals a convenient method of testing public opinion; and when, here and there, a letter of more than ordinary interest was laid before the public, it generally might be taken to represent a large unpublished mass of more or less unreadable correspondence on the same subject.

Instances have indeed occurred where, whether from a misconception of the real value of miscellaneous correspondence, or from a wish to secure subscribers by the hope that an easy means of appearing before the public in the envied garb of print was offered by the paper [illegible]ch sought their support, a disproportionate space [illegible] a public journal has been allotted to the reception of letters, as to which no principle of selection appeared to have been applied. But even apart from the intolerable inanity of these miscellaneous pages, the correspondence of the literary and scientific journals themselves is too apt to be made the medium of private opinion, or even of acrid dispute. The object appears too often to be the exaltation or the vindication of the writer, rather than the attainment of truth; and many otherwise able letters, whether bearing known literary signatures, or subscribed by simple initials, are obnoxious to this reproach.

In our own journal, in which, offering a wide medium of correspondence, the above-named inconveniences seldom arise, much information has been in this way elicited: and if, enlarging the system, the many practical and scientific readers of the *Builder* will devote a few minutes of their time to the asking and answering questions of the nature of "Building Notes and Queries," the result can hardly fail to add to the interest of the journal.

As an instance of one of the practical questions on which the collection of sound information may be of good service in many quarters, let us instance the subject of tile roofing. In one of those religious edifices that have sprung up in great numbers in the suburban districts within the last few years, there is one which was completed in the last spring, and the roof of which already shows signs that it will but ill resist the impending winter. Of course, in all such cases the right, and usually the cheapest, course to adopt, is to place the case unreservedly in the hands of some professional man—the original architect if accessible, or, in his absence, some respectable substitute. In the case in question, however, whether from a view to economy or otherwise, the persons interested in the management of the building sought the advice of the builder.

It should be mentioned that the roof was covered by flat tiles laid in mortar, and that on confining a small quantity of water by a clay edging on the top of one of these tiles, the water rather

rapidly percolated, and dropped from the underside. This seemed to account for the damp ceiling of the building, by laying the blame on the use of porous tiles; but the person who conducted this experiment was of opinion that it was too severe, and that any tiles would behave in the same manner.

Then there arises query the first,—what amount of impermeability may be fairly expected from roofing-tiles, and what is a fair test of this impermeability?

Then, query 2.—Is a plain tile the best, or one of the best, for roofing purposes? or is a necking, or slight projection on the upper part of the tile, an improvement with regard to the manner in which it will discharge its proper function of turning water?

The person whose advice was taken on the subject declared that the reason that the roof was damp was, that the tiles had been laid in mortar; he therefore recommended that the tiles should be removed from the roof,—that the mortar should be scraped from the under surface of each tile, and that the tiles, thus cleaned, should be relaid in hay.

Then there arises query No. 3.—Has mortar ever been known to render roofs wet; and, if so, why?

Query 4.—Is the practice of bedding roof-tiles in hay modern, and found to answer?

It would be easy to argue that, while any irregular use of mortar which would prevent natural drainage, would promote damp; the removal of a fair bed of mortar from the under surface of a square of tiles would only be the removal of so much material that offered at all events some resistance to weather. And it might be urged that the bedding of hay, not laid regularly like thatch, but merely crammed under the tiles as it is crammed into the rack of a stable, would only aid in conducting the external moisture to the upper side of the ceiling. Lastly, it may be said, wait and see how the hay-packed roof stands the winter.

But the object of these lines is neither to express nor to solicit opinion of a theoretical kind, but to furnish an example of that sort of question the clear statement of and the practical replies to which will not only much interest the readers of the *Builder*, but give valuable information to professional men, and tend to prevent much useless waste of money.

The practical lesson to be drawn from the experience of the present instance shall be a future contribution to the note and query department of the *Builder*.

ENTRANCES TO PUBLIC BUILDINGS.

FRIGHTFUL ACCIDENT AT DUNDEE.

ANOTHER proof of the necessity for some inspection of the modes of ingress and egress to and from buildings where meetings of the public take place, has just occurred at Dundee. A press of people were standing at the entrance of a concert-hall, below the United Presbyterian Church, in Bell-street, Constitution-road, waiting the opening of the gate, which was on a level, not with the concert-room, but with the church-floor above, so that it opened directly on a descending staircase, down which, so soon as the gate was opened, the people were pushed and fell, one on the top of another, till they formed a mass below, from which self-extrication was impossible, and out of sixty or seventy persons so placed, nineteen were taken out, in about three-quarters of an hour, dead, and many others more or less seriously injured. One of these has since died. The flight consisted of fifteen steps, and was 7 ft. wide. The space at the foot of the stairs where the mass of people, chiefly youths of twelve to eighteen years of age, lay, is only about 7 ft. by 9 ft.

There are two accounts given of the precise manner in which the accident took place. One is, that those forced in on a sudden opening of the gate were able to keep upright until near the bottom, when one or two lost footing, and having fallen, those behind rolled over them; while the other is, that a mass of persons were hurled from the top of the stairs to the bottom by the sudden impetus which they had received. The whole affair, however, was so instantaneous that no reliable account can be given of the manner in which the disaster occurred. When the advertised hour had, it appeared, arrived, the man in charge opened one-half only of the gate, but the pressure of the crowd from without was so great that the man was overpowered, and the other half of the gate was then burst open. The entrance is evidently a trap of a most dangerous description.

There are places of amusement in London where as dire a disaster may occur any evening.

QUESTION UNDER THE BUILDING ACT.

MR. EDWARD COCK, builder, No. 94, Wardour-street, appeared before Mr. Knox, at Marlborough-street police-court, to answer a summons taken out by Mr. Robert Kerr, district surveyor of St. James's, for an alleged violation of the Building Act, in erecting two buildings in the stoneyard of the workhouse, for vagrant wards (being dwelling-houses) having their walls formed of combustible materials; and also in erecting these buildings so as to prevent them from being lighted and ventilated in the mode prescribed by the Act, by communication with the open air; or otherwise for refusing to obey the requirements of the district surveyor, who, considering these wards as public buildings, had required the same to be constructed with incombustible walls and in direct communication with the open air.

Mr. Kerr gave evidence to the effect, that the stoneyard in question was a space about 90 ft. long and about 60 ft. wide, entirely covered, at a height of about 13 ft., by the public baths overhead, and receiving light and air from the ends; that the two new wards, being about 40 ft. long, were built of timber-work and boarding, about the middle of this covered area, one on each side, removed altogether from the open air, and devoid of windows; that he considered the timber walls to be dangerous as regarded fire, and the deficiency of ventilation to be also dangerous to health; and he explained that if these new wards were considered by the Court to be not public buildings, he required the application of the ordinary provisions of the Act; or otherwise, if they were considered to be public buildings, or works done in a previously-existing public building, that his demands were still the same under the provision for his special authority over public buildings, subject to an appeal to the Metropolitan Board of Works. The danger from fire he considered to be serious, looking at the character of the intended occupants; and the risk of injury to health he thought was especially to be regarded, because of the site being an old graveyard, and there being no proper circulation under the superimposed building.

Mr. Pearce, barrister, instructed by Mr. Buzzard, the clerk of the Board of Guardians, said, the question was one of great importance, not only to that but to other parishes, inasmuch as it had reference to an Act lately passed, the Houseless Poor Act; and should the decision be unfavourable, it would tend very materially to obstruct the beneficent intentions of the Legislature. In compliance with the provisions of the Houseless Poor Act, the parish authorities had erected two buildings in the stoneyard, at the back of and adjoining their workhouse, for the reception of casual vagrants. The cost of the buildings was 300*l*., and they had been approved of by the Poor-law Board under their certificate, which certificate was necessary in order to enable the parish to get from the Metropolitan Board of Works the amount of the outlay as soon as it should have been incurred. He put in a plan of the wards bearing the general preliminary approval of the Poor-law Board, and the final approval was expected daily. Now he contended that the buildings did not come within the Building Act at all, having been erected in conformity with the provisions of a later Act, to meet a temporary emergency. He contended, that the later Act would override the earlier Act, and leave the responsibility of the buildings with the Poor Law Board alone, and not with the district surveyor; that the new wards were not public buildings; and that they were not buildings at all, directly or indirectly, but temporary enclosures in an old building. He would also remark, that if the parish were obliged to pull down the buildings, or to make such alterations as to prevent them from being used for the purposes intended, the object of the Houseless Poor Act would be defeated, and the casual poor would sustain much hardship.

No evidence was called for the defence, and the district surveyor made no reply.

Mr. Knox deferred deciding till next day, that he might inspect the place. His decision was ultimately given thus:—He had come to the opinion from personal examination, that the new wards were but interior apartments partitioned off. He could not agree that the Building Act was in any degree set aside by the Houseless Poor Act; he read both Acts together without difficulty; moreover, he was of opinion that the new wards were public buildings in the sense of the Building Act; and he held that the Building Act had full authority over them but for the circumstance that they were situate within the covered building which constituted the stoneyard. If built in the open air he should have considered them in every way subject to the rules of the Building Act, but as they were formed by merely erecting partitions in what was previously in fact a room, he must dismiss the summons. The district surveyor, if dissatisfied, knew what course to pursue; but as that officer had relieved himself of all responsibility by his application to that court, this, he supposed, was all that he desired.

Mr. Kerr intimated to the clerk of the Board of Guardians, that it would be necessary for him to report the case to his superiors, the Metropolitan Board of Works, and that he would leave it entirely in their hands.

ARCHITECTURAL COMPETITORS.

SIR,—An inquirer's queries on this subject may be fairly met by the question,—Is it customary for architects to bind themselves by the conditions imposed on them? I think not. Nor is it right that they should do so. Nine times out of ten a building committee knows very little of the business they have undertaken. An architect, an originator and director by profession, should act as such, and work out what he conceives to be most suitable: and, as a man of business, endeavour to gain the commission. If he choose to lay three designs (gratis) before the judges, they will, if wise men, certainly avail themselves thereof. The question of scale and some others should be settled by the profession; and, I believe, that with proper regulation, detail drawings will not be called for. At present they are *supposed* to show the author's competence.

I suggest that a code of competition rules be prepared and circulated amongst the members of the profession, to regulate, mainly, the number of competitors; scale; who shall be the judges; how many competitors shall be remunerated; the scale of remuneration; and if stated requirements can be held as absolute conditions.

First, as to number of competitors, and their remuneration. It is but fair that if a building committee desire an unlimited number of designs, we should impose a condition that a certain percentage of the competitors should be remunerated, since the outlay by our members is largely increased. The scale for the drawings should be a small one, to economise labour as far as possible. The judges should consist of five persons,—three architects and two members of the building committee. A list of architects willing to undertake this really arduous duty should lie at the Institute, and its subscribers should serve in rotation. The instructions should be issued by them.

By thus securing competent judges, many of the present difficulties would vanish, and the profession would be taking steps to save its members from the disappointment caused by local chicanery, and by a want of compliance with conditions which are perhaps illogical or ridiculous.

AUGUSTUS FREER.

MONAGHAN AND CAVAN LUNATIC ASYLUM.

SIR,—Many of your readers will remember that architects were invited, more than a year ago, to submit designs for the above, and that a large number were sent in from English and Scotch, as well as Irish architects, in which it was said at the time that much ability was displayed. Those who engaged in the contest will remember that a selection was made, chiefly on the ground of economy, of a design which the author estimated could be executed for 25,000*l*., or at the rate of about 80*l*. per patient, the number to be accommodated being 300.

The tenders for this design have only just been received, and I am informed that the lowest eligible tender reaches the sum of 35,000*l*., exclusive of a number of indispensable items which will probably bring the amount to 40,000*l*.

It is clear from the above that those architects who sent honest estimates with their designs, were placed at a great and unfair disadvantage by the low, and as now appears, deceptive estimate sent with the selected design: and it appears to me that the committee are bound in honour to re-consider their decision.

ONE OF THE COMPETITORS.

THE SIR TATTON SYKES COMPETITION.

SIR,—It is more than three months since the designs for the above memorial were sent in, and not a word has been heard about the decision of the committee.

It is quite time the unsuccessful designs should be returned, and the names of the "successful competitors" made known.

A COMPETITOR.

ORNAMENTING IRON AND STEEL.—Mr. Christian Weintraud, jun., of Offenbach, Hesse Darmstadt, has patented an invention, which consists in ornamenting, by drawing, or otherwise marking, on the surface of steel or wrought-iron, which must be first polished or bright, or "matted," any desired spots, pattern, or device, with boracic acid. The metal is then fired, and according to different temperatures so will the effects differ.

METROPOLITAN BOARD OF WORKS.

THE RIDLEY TENDER.

AT the last weekly meeting of the Board the correspondence as to Mr. Ridley was read by Mr. Bazalgette, after which Mr. Doulton moved that the letters be printed and referred, with the rest of the correspondence, to the Main Drainage Committee. He was sure, he said, that when the letter of Mr. Bazalgette and the confirmatory letter of Mr. Gregory were placed before the public they would be prepared to say that they entirely exonerated the Board from the charge of acting in opposition to the interests of the ratepayers of the metropolis. He was certain it would be felt that the chairman had acted with prudence and judgment, and that the engineer's character was entirely vindicated.

Mr. Legge seconded the motion. He hoped the correspondence would go to the public, and do justice, not only to the engineer, but to Mr. Ridley and the Messrs. Waring. It would prove that Mr. Ridley at the time of sending in the tender was a man capable of carrying out the contract, and quite willing to do so. The inquiry was not as to his private character, but as to his capability to carry out the contract. It regarded the man's credit. It showed that, if he had taken his employer's money, when Providence placed him in a position to repay it, he came forward voluntarily to do so. The sum was 100*l*. He calculated that the interest would double it, and he said, "Here are 200*l*. to make ample amends for any wrong I have done you." The public would come to a just conclusion at the end, and would judge whether Mr. Ridley was or was not capable at the time of carrying out the contract.

Mr. Lowman Taylor thought that on that day the engineer was simply to be asked for information, and that they would not go into any discussion. They were not prepared for it, because they had not till now the papers in their hands, and justice could not be done to either party. It was difficult to determine the question between the two parties, and they should not go into it that day. The information contained in the report of the engineer appeared to be rather incomplete, and there might be a complaint that something was withheld because there were blanks in it.

The Engineer, in reply to the question respecting the blanks, said the information was given to him in confidence, and, therefore, the blanks were in the report.

After a few words from Mr. Tite and Mr. Freeman, the motion was agreed to.

PROVINCIAL NEWS.

Eye (*Suffolk*).—An extensive flax manufactory has been erected in the outskirts of the town, on the Hoxne-road, to replace old works which were burnt in May last. The walls are of clay-lumps, faced with brick. The bricklayers' work was done by Mr. Ramplin, of Eye, and the carpenters' work by Mr. Gooderick, from Sir E. C. Kerrison's estate. All the bricks and the wood were supplied from the estate, and the work generally was superintended and carried out by Sir Edward's own people. Messrs. Chase hire the building from Sir E. Kerrison. In the internal arrangements rooms have been provided in which the workpeople can get their meals, separate accommodation being given to the men and boys, and to the women and girls. At present only the female meal-room is completed, and the males will therefore use the foreman's house, which stands within the enclosure of the works. The total cost of the building and machinery has been from 7,000*l*. to 8,000*l*.

Woodbridge (*Suffolk*).—The railway company have erected a grain warehouse here, 130 ft. long by 50 ft. wide, capable of holding 3,000 coombs of grain. The building is of red and white bricks, and was erected by Messrs. Perry & Judson, of Stratford, contractors, the brickwork being done by Messrs. Cullingford & Forsdike, of Woodbridge. It is lighted by ten fanlights on one side, and four roof-lights, and fitted up with gas-burners.

Bristol.—The subject of new assize courts has been much discussed in this city. Among the proposed schemes is one by a corporate official, who proposes using a site on the Grove, Queen-square, and building handsome courts. Plans are in preparation, and they will shortly be laid before the council.

Bath.—The foundation-stone of the new bank premises at the top of Milsom-street, for the National Provincial Bank of England, has been laid. The building, when completed, will be similar in style to the centre houses in Milsom-street. The elevation in this street will comprise four stories. The attic will be terminated with open stone balustrading and vases. The main cornice will be supported by four Corinthian three-quarter fluted columns, resting on a rusticated basement. There will be two entrances, one in the centre of the elevation facing York-buildings, and the other in the rounded corner between the two streets. The York-buildings elevation will be similar to that in Milsom-street, the only difference being that the main cornice will be broken by a large pediment supported by six Corinthian columns, the tympanum of which will be carved with the Bath arms and a group of emblematic figures. The attic will be similar to that in the Milsom-street elevation. The banking-office will be large, and lighted by three windows, looking into York-buildings, and by a circular dome lantern supported by four polished marble pillars, in Caen stone, of the Ionic order. The ceiling will be decorated by Messrs. Green & King, of London. All the fittings will be of oak, enriched by mouldings and carvings. In the basement there will be a strong room, under the banking-office, fitted up with lift and all modern appliances. The building will be fireproof, iron joists and girders being used throughout. The design is by Messrs. Wilson & Willcox.

Middlesborough-on-Tees.—Mr. H. W. F. Bolckow, a member of the firm of Bolckow & Vaughan, ironmasters, has intimated his intention of making a gift to the inhabitants of 100 acres of land, in a convenient position, which is to be completely laid out as a public park, at the sole expense of the donor. There are now 25,000 inhabitants in Middlesborough, and they labour in many factories, mills, furnaces, and other works of the great iron industry, where, thirty years ago, a solitary farm-house stood,—the rise of the town has been so rapid.

FROM SCOTLAND.

Greenock.—The old west church has been restored and re-opened. The work of restoration has been executed from designs by Mr. James Salmon, of Glasgow, by the following tradesmen:—Mr. P. Cram, mason; Mr. J. Black, joiner; Mr. G. Burns, slater; Messrs. Brownlie, Buchanan, & Co., plumbers; Messrs. Finlay & Weir, gasfitters; Messrs. Johnstone & Lochhead, painters; Messrs. R. Blair & Son, upholsterers; Mr. J. Chalmers, smith; Mr. J. M'Dougall, master of works. The edifice has a new tower and spire, but the building generally was not found to be so dilapidated as to require re-erection. Stained glass windows have been executed for it by Messrs. Ballantine & Son, of Edinburgh. The subject represented in the large north window, is the "Adoration of the Magi." That of the large south window is "Jesus calling his first Disciples." In the dexter side of the twin-light north window, is a representation of "Jesus teaching Mary," and in the sinister light he is "Blessing little Children." The church is lighted in the evenings by two gaseliers, and brackets under the galleries. The warming is by a Gill stove.

GAS.

THE report of the directors of "The Parà Gas Company (limited)," has been issued. From this report it appears that the contractors, Messrs. Peto & Aird, have nearly completed the works at Parà, in Brazil, and that the city has for some time been lighted with gas. Messrs. Peto & Aird have been paid 81,547*l*. for the works, and the expenses of the engineer, Mr. Thomas Rumball, amount to 3,666*l*. The capital of the company was 100,000*l*., and they have still a balance of 4,226*l*. at their banker's. The income of the company from the supply of gas to the Government and the city is not yet available; and the directors only recommend a dividend of 5 per cent. per annum for the last half-year. The streets, churches, and private dwellings are all being lighted up with gas. The affair promises very well.——The city of Alexandria has been lighted by gas, the works having been erected by a French company. The lamplighter is nightly followed in his rounds by a crowd of wondering Arabs, who insist that the marvellous blaze following the touch of his torch must be provoked by the will of a *genie*, or "djinn," as Mr. Lane would have us spell the familiar word of the Arabian nights. Heretofore a municipal regulation required everybody going abroad after nightfall to carry his own lantern, but this is no longer necessary.——The directors of the Sheppy Gas Consumers' Company have resolved to reduce the price of their gas from 5s. to 4s. 6d.; and the directors of the Hythe and Sandgate Gas and Coke Company have also announced their intention of making a further reduction of one shilling per 1,000 ft. The price will then be 6s. 6d., and the allowance of discount at the rate of 6d. per 1,000 ft. on prompt payment will further lessen the sum to 6s.

RAILWAY MATTERS.

THE forty-seven railway schemes which will next session be submitted to Parliament in reference to London are said to represent no fewer than 151 separate lines and branches, with a total length of 349 miles. Of these, twenty-three relate to the south side of London. The longest on the list is the London, Bucks, and East Gloucestershire, 59 miles 6 furlongs.

We understand, says the *Railway News*, that the appointment of a select committee of the House of Commons will be moved for immediately after the assembling of Parliament, for the purpose of inquiring into the whole question of railway management, and for considering whether any and what steps are necessary with a view to their being made more conducive to the interests of the public. It is further stated that the proposal will not be opposed by Government.

The traffic receipts of railways in the United Kingdom amounted for the week ending the 17th December, on 11,732 miles, to 607,586*l*.; and for the corresponding week of last year, on 11,395 miles, to 583,826*l*., showing an increase of 337 miles, and of 23,760*l*. in the receipts.

The wear and tear of wooden sleepers have led several of the railway companies in France and other Continental States to adopt iron ones. Of all the processes yet adopted for arresting the decay of wooden sleepers, not one has been found to succeed. They expect a great saving both of time and capital by the use of metallic bearings.

The French commission for examining different questions relative to the service of railways has just issued its report. Among the improvements suggested is that of a more convenient disposal of the interior of the carriages. The American long carriage, with a communication from end to end, is preferred, with saloon, reading and smoking compartments, water-closet, &c.

The Rome correspondent of the *Morning Post* mentions a rumour that Mr. Pope Hennessy, M.P., has obtained from the Papal Government the concession of the recently-projected railway from Rome to Tivoli.

General M'Clellan has been appointed chief engineer of a railroad in New Jersey, upon a salary of 15,000 dollars per annum, the sum which he would have received had he been elected to the Presidency;—at least, so we are told.

CHURCH-BUILDING NEWS.

Camberwell.—The chief stone of a new church, dedicated to St. Andrew, has been laid here, in the Derwent-road, on a site given by Mr. Thomas Cook. The edifice will consist of nave, north aisle, transept, and chancel, with organ chamber on the north, and vestry on the south side. The tower, with spire, is at the north-west corner, and communicates with a cloister porch, the whole width of the west front, and with a porch entrance at the south side of the nave. The space between the tower and north aisle, will be occupied by a side porch, containing a staircase to the west gallery across the nave. Exteriorly the building will be constructed of Kentish rag walling, in drop courses, with Bath stone dressings and red Mansfield bands, with the exception of the spire, which will be of slate in bands. The roofs will be covered with red and brindled Staffordshire tiles. The interior will be lined with bricks, with bands and arches of white and yellow brick, the walls being finished in stucco. The extreme exterior dimensions will be 130 ft. 3 in. from east to west, and 65 ft. from north to south. The height to apex of nave gable will be 56 ft., and of spire 140 ft. to top of vane. The accommodation will be for about 900, and the cost will be 5,300*l*., inclusive of chancel fittings and font. The architects are Messrs. Keeling & Tyrie, of London.

Rusthall.—St. Paul's Church, Rusthall, has been re-opened after enlargement. The sittings, which were before 366 in number, are now increased to 620, of which half are free, the best seats in the church being set apart for the working classes. The original church was erected in 1850, from the designs of Mr. Stevens, of Derby. The architects have effected the enlargement by the addition of a north aisle, a prolongation of the north transept, and the erection of a north porch at the extreme east bay of the new aisle. The extreme internal width of the body of the church from south to north is now 48 ft., and the length 77 ft. The new aisle is connected with the nave by a pointed arcade of five openings, the easternmost being less than the other on account of the required abutment of the central tower. Each pier is a cluster of four shafts of dark serpentine marble, with caps and bases of Caen stone. The west gable is perforated by a three-light transition window, and exactly opposite thereto the side of the transept has a double-light opening, of a similar character. The additional requirements of light have been met by doubling the lancet on three of the side windows, which have central marble shaft supports. The transept has a new roof, with diagonal ribs forming a groin over the large arch and each window. The covering is of round-ended Newcastle tiles. Several painted glass windows have been added. The heating-apparatus by hot water has been extended throughout the new work, by Mr. William Catt, of Tunbridge Wells. The works have been carried out by Messrs. G. Mansfield & Son, of London; Mr. G. Moat acting as clerk of the works. The architects were Messrs. Stevens & Robinson.

Stratford (*Essex*).—The new church of St. Paul, in the new town, has been consecrated by the Bishop of London. The site, which was given by the Great Eastern Railway Company, is in the Maryland-road. It contains space also for schools and parsonage. The church will accommodate over eleven hundred adults on the ground-floor, and it has a west gallery for children. The walls are of brick, with Bath stone dressings, and arches of black and red bricks. The roofs, except that of the chancel, are ceiled to the underside of the rafters, and are covered externally with blue and pink Bangor slating, excepting the turret, which is covered with green Westmoreland slates, with lead rolls. The nave roof has terro-metallic shark's tooth cresting tiles, and the chancel roof a wrought-iron ornamental ridge railing, about 2 ft. high, supplied, together with the iron terminals to the gables, by Messrs. Peard & Jackson. The nave and chancel aisle arches are of yellow, red, and blue brick, with stone keys and springers, and are supported by cast-iron columns, with polychromic decorations in oil. The arches to the windows throughout are in coloured brickwork, and the interior is otherwise finished in stucco. The carving is of natural foliage, emblematic in character. It is the work of Mr. Williamson. The plan consists of nave and chancel of equal width and height, and north and south aisles, also chancel aisles in three gables. The roof over the chancel (which is semi-octagonal), is boarded diagonally to the underside of the rafters. There is at present no tower or spire, though they are provided for in the design separate from the main building. The extreme external dimensions are 139 ft. 6 in. from east to west, and 60 ft. 6 in. from north to south, and 45 ft. in height to apex of nave gable. The actual cost has been a little short of 4,000*l*. Mr. E. B. Keeling was the architect.

Bury St. Edmund's.—A new church, erected from the designs of Mr. H. F. Bacon, of London, architect, formerly of this town, has been consecrated at Whitwood Mere, near Castleford, by the Archbishop of York. The church is built upon a site given by Mr. T. P. Bland, of Kippax, and the Queen contributed 20*l*. towards its erection. Its architecture is in the Early English style, and it contains sittings for 320 persons, including accommodation for 96 children. The cost up to the present time has been rather more than 1,000*l*. The tower has only been carried a sufficient height to form a porch. It will be raised higher, and surmounted with a spire, when sufficient funds for the purpose have been obtained. The church is built of stone got in the neighbourhood, but the walls are lined with brick.

Yardley Gobion.—A new church has been consecrated at Yardley Gobion, a hamlet on the Northampton and Stony Stratford road. The Duke of Grafton has defrayed the entire cost. The church is a parallelogram 60 ft. by 28 ft., with a chancel 22 ft. by 16 ft., and a small vestry or robing-room, and is capable of seating about 150 adults. The style is Geometrical, but the tracery of the windows varies in design. The edifice is built of the native stone, left rough on the face, with Bath stone dressings. Over the windows are relieving arches of stone alternating in colour; an admixture carried out exteriorly by the introduction of coloured stone shafts to the porch and priest's doorways, and stone lintels over windows of porch, &c. There is a porch on the north side next the street, and a bell campanile, or turret, at the west end of the nave, on the wall dividing it from the chancel. The interior is simple and plain. The nave and chancel have open roofs of yellow deal, with collar beams and curved ribs resting on stone corbels. The walls of the interior are stuccoed, the colour relieved by arches over the windows in red brick. The chancel arch is a recessed one of brick, red, black, and white, resting upon short pillars, with carved caps and corbels of Bath stone: the pillars are of red Duston stone. The "reredos" is of Bath stone and red brick, all flush, but panelled. The seats are of yellow deal, stained and varnished, as are also the pulpit and prayer-desk. The floors of the passages in the nave are of red and black tiles, and that of the chancel red, black, and buff. The church is heated upon the plan of Mr. Fitter, of Woolston, near Coventry, and that part of the work has been executed by him. The whole of the roof timbers are exposed to view, and are stained and varnished. The whole cost of the church has been about 1,750*l*. The architects, from whose design, and under whose immediate superintendence the building has been erected, were Messrs. Law & Sons, of Northampton. Mr. Hailey, of Stony Stratford, was the builder. The carving has been executed by Mr. White, of Northampton, the artist employed at the new town-hall.

Belvoir (*Leicestershire*).—The tower of the old Gothic church at the village of Belvoir has given way. It has been shored up with beams, pending more durable repairs. The services of Mr. Scott have been retained to insure the proper execution of the work, which, we understand, will cost about 1,400*l*. Mr. Wilson, of Grantham, builder, will carry out Mr. Scott's plans.

Coventry.—The late Mrs. Hill Morgan, of Cheltenham, we understand, has bequeathed the sum of 10,000*l*. for the erection of a new church at Coventry.

Thursford (*Norfolk*).—We are requested to state that Mr. T. Gidney, of East Dereham, supplied the warming-apparatus to Thursford Church.

DISSENTING CHURCH-BUILDING NEWS.

Liverpool.—A new Presbyterian Church is to be erected for Everton, at a cost of about 4,500*l*., if the funds can be raised by subscription for the purpose.

Saltburn-by-the-Sea.—The foundation stone of a New Wesleyan Chapel has been laid here, on a site at the corner of Emerald-street, facing Milton-street. The design was prepared by Mr. Peachey, of Darlington. It represents a structure of the Early English style, estimated to cost about 1,000*l*., and calculated to seat comfortably 300 on the ground floor; and provision is made for the erection of galleries, when needed, to seat 200 more. Tenders for the building have been let as follow:—Brickwork, &c., Mr. W. T. Spencer, of Saltburn; joinerwork, &c., Mr. John Wallace, of Brotton; plumber, Messrs. Russell & Sons, of Darlington; slater, Mr. R. Preston, of Sunderland.

Shields.—The new United Methodist Free Church, Queen-street, South Shields, has been opened for divine worship. The new church occupies the site of the former chapel and vestries, which were pulled down to erect the present more commodious edifice. The new church is in the Italian style of architecture, and is built of stone. The size of the edifice on the ground-floor is 58 ft. 6 in. by 46 ft. 9 in., clear of the walls. Behind the pulpit are three vestries, under one of which is the hot-water apparatus for heating the chapel. In the gallery, the church is 47 ft. 3 in. by 68 ft.; and from floor to ceiling the building is in height 32 ft. 6 in. The gallery is supported on cast metal Corinthian columns. The ceiling is flat, with an enriched cornice. In the centre of the ceiling is a sunlight, containing thirty-four burners. The pews are without doors, and are grained. The building contains accommodation for 800 persons, and the cost of it is about 2,200*l*. The architect of the building was Mr. John Tillman, Sunderland; mason, Mr. J. Hirst, Sunderland; plasterer, Mr. J. Charlton, Newcastle; carpenters and joiners, Messrs. Surtees & Forrest, North Shields; slater, Mr. W. Wylie, South Shields; plumbers, &c., Messrs. Glaholm & Co., Sunderland; painter, &c., Mr. J. Scott, Newcastle. The decoration has been done, under Mr. Scott, by Mr. Thomson, of North Shields.

STAINED GLASS.

Norwich Cathedral.—The nave of this cathedral has recently had a memorial stained glass window inserted. It is the easternmost of two windows, of precisely similar design, situate on the south side of the nave, in what is called Bishop Nykke or Nyx's chantry, a side chapel formed by two bays, and separated from the centre aisle by an altar tomb. The glass tells one continuous story, representing the history of the "Good Centurion," as related by St. Luke (vii. 1 to 10), and St. Matthew (viii. 5 to 10). Commencing with the upper portion of the eastern light, there are—1. "Jesus entered into Capernaum;" and below, in the same compartment,—2. "A certain Centurion's servant was sick." 3. "He sent unto Jesus the elders of the Jews." 4. "And they besought Him instantly." 5. "Then Jesus went with them." 6. "The Centurion sent saying, Lord, trouble not Thyself!" 7. "I am not worthy that Thou shouldest come under my roof." 8. "For I am a man under authority." 9. "I have not found so great faith, no not in Israel." 10. "And his servant was healed in the selfsame hour." By this arrangement and order the narrative is preserved in sequence. Natural forms, the oak and the vines, have been used in the details of the diaper in the spaces between the groups. The artists were Messrs. A. and W. H. O'Connor, of London. The window has been erected by Mr. R. J. H. Harvey, of Crown Point, to the memory of his father, Sir Robert Harvey.

Upperthong Church.—A stained-glass memorial window has lately been put up in this church, to the memory of five infant children of Mr. Jas. Charlesworth, of Holmfirth. It is Perpendicular in style, and consists of two compartments, with tracery. The subjects, Christ Blessing little Children, and the Presentation in the Temple, occupying the main openings, are inclosed within foliated canopies. This window was also from the establishment of Messrs. R. B. Edmundson & Son.

Sowerby Bridge Church.—This church has lately been enriched by the addition of a series of stained-glass windows. The three principal ones, which are placed in the chancel, are memorial windows, and consist each of one large opening. The subjects are the Nativity, Crucifixion, and Ascension, and are inclosed within borders and foliated canopies. Erected on the south side of the nave are four three-light windows, the centre light of each having a full-size figure of one of the Evangelists, inclosed within a canopy and border. The side lights of each of these four windows are in grisaille. The first window (St. Matthew) is also a memorial window. In the baptistery is another window of three lights, similar in size and character to the above. The centre light contains the Baptism of our Saviour, under a canopy. The whole of the above series were executed by Messrs. Edmundson & Son, of Manchester, who are also engaged to decorate the chancel.

Bolton Church, Cumberland.—A stained glass window has been recently erected to the memory of the late Rev. John Sherwan, curate of this church. It comprises two lights, and is in the Decorated style. The subjects are, "The Presentation in the Temple," with text, "Mine eyes have seen thy salvation;" and the "Raising of Lazarus," with text, "Lazarus, arise, and come forth." These are inclosed within borders, and surmounted by foliated canopies. This window has been executed by Messrs. R. B. Edmundson & Son, of Manchester.

St. Ann's, Highgate Rise.—This church has been lately enriched by another stained glass window, the gift of Mrs. Ryder, and erected as a memorial of her late husband. The window consists of two openings, each containing a separate subject. In one the subject is "Naaman coming to Elisha to be healed of his Leprosy," with the text from the Old Testament "Behold now I know there is no God but in Israel." In the other the subject is, "Our Lord healing the Impotent Man at the Well of Bethesda," accom-

panied with the text, "Arise, take up thy bed, and walk." Both are surmounted by foliated decorated canopies, and inclosed within a border in character. The arms of the deceased have been emblazoned in the quatrefoil at the head of the window, and a memorial brass at the base bears the inscription. The window was from the establishment of Messrs. R. B. Edmundson & Son, of Manchester.

Glasgow Cathedral.—The minor windows in the cathedral, not included in the grand series now completed, are quickly being filled. Six windows have just been erected in the clerestory of the cathedral, five of them triplets and one lancet. Four of these windows are in the transept, two are in the choir. The subjects are, Zechariah and Elizabeth, Simeon and Anna. The choir lancet is the gift of Mrs. Ramsay and Miss Davidson, in memory of the late Professor Davidson, of the University, and father of those ladies. The subject is Martha. All are from Munich.

ROMAN CATHOLIC CHURCH-BUILDING NEWS.

Greenhithe.—A new church has been opened at Greenhithe. The church is of small dimensions (the interior being about 50 ft. by 22 ft.), and accommodates about 200 persons.

Newton-le-Willows.—A new church at Newton-le-Willows, dedicated to St. Mary and St. John, has been consecrated by the bishop of the diocese. The new church, which has been erected by Mr. J. Middlehurst, of St. Helen's, from the designs of Mr. Gilbert Blount, of London, is in the Gothic style, and when finished the cost will be about 4,000*l.*

Runcorn.—The first stone of a new Roman Catholic Church at Widnes, near Runcorn, to be dedicated to St. Mary of the Assumption, has been laid. The building, which is to be erected in Frysdale-street, will be set back several feet from the parapet, and the north side will run parallel with the road. It will present an elevation of about 108 ft. in length, and the nave will be divided by buttresses into seven compartments or bays, each having two single-light windows, with arched heads. In the first bay will be the great doorway of the church. The west end will come within a few feet of adjoining cottages. It will have lofty single windows in the ends of the aisle, and three single-light windows in the nave. Above will be corbelled out a belfry of stone, with high leaded roof, to be surmounted by two crosses, which will be 80 ft. above ground. The chancel at the east end will have a semi-octagonal end, with two windows on each face, placed high up, so as not to interfere with the effect of the altar. The interior will be divided by pillars and arches, nearly 30 ft. high, into nave and aisles of six bays. The north aisle will terminate in a side chapel, with a tracery wheel-window at the end. In the south aisle two confessionals will be built out, each of three compartments. Under the windows of the aisles will be panelled recesses for sculptured representations of the Passion. The aisle-roofs are to be open, and the timbers exposed. They are to be supported by arched principals, resting on the capitals of the pillars and corbels on the outer side. The roof of the nave is to be carried by seven arched principals, resting on stone corbels. The timbers will be exposed to view nearly the full height of the roof. The clear height from floor to ceiling will be 48 ft., and to the ridge of the roof, 56 ft. The chancel roof will be a continuation of the nave roof, but divided into panels by moulded ribs. At the west end of the church is to be an organ-gallery the width of the nave, and 14 ft. long. It will be carried by an arch in one span. The interior dimensions of the church will be as follow:—Nave, 26 ft. wide, 83 ft. long, and 36 ft. high to the spring of the roof; aisles, 11 ft. 6 in. wide, 83 ft. long, and 25 ft. to the spring of the roof; chancel, 26 ft. wide by 19 ft. deep. The total length of the church will be 103 ft., and breadth 49 ft. It is calculated to seat about 500 persons. The exterior is to be brick, with dressings of Appleton stone sparingly used, and relieved by bands of blue brick. The general effect of the church will be very plain, owing to the small amount to which the architect was restricted. The cost of the entire church will not exceed 3,100*l.*, though, at present, it is to be feared that, owing to want of funds, the chancel will have to be left to a future time. Mr. E. W. Pugin is the architect; and Mr. Middlehurst, of St. Helen's, is the builder. The building will be completed in about nine months.

Durham.—The "solemn opening of the church of our Lady of Mercy and St. Godric of Finchale," has taken place here. The church is situate in Framwellgate. The site was purchased about seven years ago of Miss Williams, for 1,800*l.* A large brick mansion—at one time the principal hotel in Durham—has been fitted up as a convent, and occupied, during the last three or four years, by a community of Sisters of Mercy. Up to the time when the foundation stone of the new church was laid, 3,000*l.* had been raised towards the erection. The plans were provided by Mr. Pugin. The style is Decorated Gothic. The building consists of a nave and north aisle, 120 ft. in length, and 38 ft. in breadth. The east end terminates in a hexagonal apse. On the south side there is a chapel for the Sisters of Mercy, and a large vestry. A covered cloister connects the church with the convent.

THEATRICAL.

English Opera House, Covent Garden.—We have no hesitation in calling *Cinderella* the best pantomime of the season. The story is compact; the Paynes, especially Mr. F. Payne, are inimitable; the appliances magnificent; and the scenery, by Mr. T. Grieve and his assistants, includes three admirable works in different departments,—"The Butterfly Haunt," a landscape; the Vestibule leading to the Ball-room, as an architectural interior; and the transformation scene, titled the "Flight of the Hours." For grace, elegance in the forms and movements, and harmony of colour, this scenic and mechanical composition has never been surpassed, and the veteran artist, the Nestor of scene-painters, is justly called forward every evening to receive the thanks of the audience for the delight afforded them. Donato's performances show a victory over nature of the most remarkable kind; and the *pas* of three legs, which immediately follows him, is a lucky thought, well carried out. In half a dozen more words, the pantomime here is a great success.

Her Majesty's Theatre.—The want in Mr. Harrison's pantomime ("The Lion and the Unicorn") is a want felt in most of the pantomimes and burlesques this season,—the want of real fun. The dancing is pretty, the scenery is gay, the transformation scene, indeed, very elaborate. The "Eidos Aeides," as they choose to call an optical illusion introduced, is effective. "And what," says Juvenis, "is Eidos Aeides?" εἶδος is a noun from the root εἰδω, to see (Latin, *video*); and means that which is seen,—the form, shape, figure, &c.: ἀειδής is from the same root, with the *a* privative, and means the reverse of the former; viz., unseen, without bodily form, and immaterial. In fact, the advertisement explains itself. The visible invisible being a very good translation, and all they want to convey.

RECENT PATENTS CONNECTED WITH BUILDING.*

FIRE-PLACES.—*E. B. Wilson.* Dated 16th January, 1864.—The patentee closes the bottom grate, and introduces between the front bars and the back of the fire-place a diaphragm, extending upwards to meet the upper part of the front of the stove, so as to divide the fire-place into a front or combustion chamber, and a back chamber or flue. When a fire is lighted in front of the diaphragm, the gaseous products of combustion are caused, by the chimney draught, to pass through holes or open space into the flue behind the diaphragm, fluted hollows in the front of the diaphragm forming channels for their passage.

LIME-KILNS.—*H. Robinson.* Dated 18th August, 1864.—The patentee claims, first, the application of heat to lime-kilns for the purpose of burning limestone by means of a fire or fires placed outside and around the kilns, and having access to the limestone by means of apertures in the walls of the kiln in connexion with the flues of such fire or fires. Secondly, the use of steam jets either behind the fire and within the flue, or within the chimney or stack, whether detached from or a part of the kiln, though he does not claim the use of steam jets for aiding the draught of an ordinary fire or fires, but simply its application to lime-kilns where the flames and the heat require to pass through a compact mass of limestone. Thirdly, the application of a steam jet for the cooling of the grate bars of lime-kilns. And, lastly, the combined arrangement of air drifts or galleries, external fires (that is to say, fires that are placed without the kilns), and the steam jets before named, substantially as described for the purpose of burning lime; and also the use of double doors in the front of the discharge-hole, all as described.

CONSTRUCTING SEA AND RIVER EMBANKMENT WALLS, PIERS, AND OTHER STRUCTURES WHOLLY OR PARTLY IMMERSED IN WATER.—*B. P. Stockton & J. S. Scott.* Dated 3rd March, 1864.—The patentees propose to form a foundation platform of iron, stone, timber, or other suitable materials, supported upon and securely fastened down to cylinders or piles, or other suitable supports, and made sufficiently strong and water-tight to admit of the superstructure being erected thereon, and resisting the upward pressure of the water. A tank dam is to be attached to this platform, of which the platform itself forms the water-tight bottom. By this arrangement a secure and dry chamber is obtained, within which the structure can be erected. As each section or length of the structure is completed, the sides and ends forming the tank dam may be removed, leaving the structure supported by the foundation platform. In cases where the platform might be liable to oxidation or rapid decay, or required to be removed, "relieving" or "groined" arching, or concrete, or stone blocks, may be used in the lower part of the structure, which would form a sufficient foundation or support, bearing directly on the cylinders or piles, in the event of the platform being entirely destroyed or removed.

* Selected from the *Engineer's* lists.

Books Received.

Specimens of Early French Architecture, selected chiefly from the Churches of the Ile de France. By ROBERT J. JOHNSON, M.R.I.B.A. Published by the Author, 15, New Bridge-street, Newcastle-upon-Tyne.

CONSIDERING that a dozen or so copies of this work, now completed, alone remain unsold, it may be useful to some of our readers to bring once more to their notice this, to Mr. Johnson, very satisfactory fact. During the progress of the work we have at various times mentioned it with great commendation,—commendation fully justified up to its close. In its completed form it consists of 100 plates, geometrical and perspective; measured, sketched, and lithographed by the author, and which illustrate some of the best examples of the earlier Pointed architecture of France.

Mr. Johnson has great mastery over the pencil, and we have good reason to believe in his accuracy, after comparing some of his plates with our own sketches from the same subjects, made years ago. We cordially congratulate him on the successful completion of his undertaking.

The Old City, and its Highways and Byways. By ALEPH. London: W. H. Collingridge, City Press. 1865.

THIS is a much better book than "London Scenes and London People," by the same author, and if that has met with "an unexampled success," as stated, this should certainly not do less. The writer has trusted more to himself, to his own recollections and experiences, and the result is a very readable and interesting volume about persons and places in the Old City. A sad mistake is made at starting by giving opposite the title-page an engraving of Wren's scheme for rebuilding London after the fire, never carried out, as a "plan of London in the time of Wren!" However, this has nothing to do with the merit of the book itself. The illustrations are well engraved by Mr. Sheeres.

VARIORUM.

"Bacon's Railway and Commercial Map of the British Isles" (Paternoster-row), is certainly the best for the money we remember to have seen. It forms one of the "Popular Series" based on the ordnance surveys, newly engraved on steel in the good style, and contains all improvements to the present date. It is remarkably clear and satisfactory.—Mr. Stanford has issued a new Map of proposed railways and miscellaneous improvements for session 1865; also the sanctioned lines of railways in operation

within London and ten miles round. An enlargement is given of the proposed lines in the eastern part of the Metropolis, which includes a pretty piece of involvement in the neighbourhood of New-cross and Deptford. The map will be found useful.——"Transactions of the Institution of Civil Engineers of Ireland, 27th session, 1861-2, vol. vii., parts 1 and 2 (Dublin: Falconer. 1862 and 1864). Among the various papers here given, are a Description of the Crumlin Viaduct, by Mr. A. M'Donnell; on the Action of Sea Water on Lime Mortar, by Mr. B. B. Stoney; Description of the Madras Railway, by Mr. T. H. Going; and various others of a more or less useful description. The letter-press is illustrated by engravings.——"A Dictionary of Chemistry and Allied Branches of Science." Parts 21, 22, and 23. (Longman & Co.) The word Menthol concludes the last of these parts, the chief subjects in which are Light, Limestone, Liquids, Madder, Magnesium, Magnetism, Manganese, and Manure. The last is a very elaborate paper, in which Liebig's views are severely handled.——"The Popular Science Review," edited by Henry Lawson, M.D. (Hardwicke, Piccadilly.) This popular review, of which every one speaks well, contains, as usual, a variety of specially interesting papers. The first is by Mr. R. Hunt, F.R.S., on the Source of Heat in the Sun, with engravings of the total eclipse of the sun, and of solar spots, one on a large scale and showing the curious willow-leaf phenomena. Another of the papers is by Dr. B. W. Richardson, on waves of heat and waves of death, in which the author treats of the influence of cold in increasing human mortality after middle life. In alluding to sanitary matters, Dr. Richardson (incidentally, merely, it is true) says,—"In regard to spreading diseases we hear now almost exclusively of one cause,—drains and the smell thereof," and he makes no allusion whatever to overcrowding, want of ventilation, close bed-rooms, and other causes of the spread of fevers, which sanitary pioneers assuredly *now* press on the public attention at least fully as much as drains and their foul emanations,—if not more so, and for this simple reason that they have already fully established a public opinion in favour of thorough drainage as a preventive of fevers of the typhoid class, and are now more particularly dinning warning into the public ears as to such evils as that of foul air from close bed-rooms by night, from overcrowding and uncleanliness, and from want of ventilation generally, as in workshops, &c., these being all causes of the spread especially of typhus fever, and of at least the aggravation, if not of the origination, of many other causes of illness and of death.

Miscellanea.

WORKMEN'S HALL AND EXHIBITION, STRATFORD. For the purpose of erecting a workmen's hall for meetings and social converse, a sum of 600*l.* has been raised; and for its increase a workmen's industrial exhibition has been opened in the National School-rooms, Station-street, Stratford. The number of articles exhibited is 434.

FOREIGN ART FOR DUBLIN INTERNATIONAL EXHIBITION.—We find that from Brussels the list of demands already numbers 110 applicants in the Industrial Department, and 117 artists. Forty of the best artists of Düsseldorf have given their adhesion, and a large number of the Scandinavian painters, headed by M. Adolph Tidemand. Munich will furnish cartoons of the most celebrated artists, and all the leading painters will contribute, including Kaulbach, Schwind, Piloty, Froltz, and Schrandolph.

SURVEYING AND PHOTOGRAPHY.—At the Academy of Sciences, Paris, in the *séance* of the 12th ult., General Morin presented, on the part of M. Lanssedat, professor of the Polytechnic School, a new and perfectly successful application of photography to topographical and other surveys. In this instance, the plan was one of Grenoble and the environs, to a scale of $\frac{1}{2000}$, extending over 20 square kilomètres, obtained by two photographic lenses of 50 and 25 centimètres focal distance. With these, in 60 hours, at distances varying from 1,500 to 4,530 mètres, 29 views were taken from 18 stations. These views were transported to Paris, and studied and reduced in the office, a plan having been laid down as perfectly as could have been done by the ancient mode, after several weeks' or perhaps months' labour on the ground.

SOUTH KENSINGTON MUSEUM.—During Christmas week the visitors numbered 35,984.

LIVERPOOL ARCHITECTURAL SOCIETY.—The weekly meeting was held on Wednesday, December 28th, Mr. Joseph Boult presiding. A communication was read from the secretary to the Committee of Council on Education, asking for suggestions as to what additional examples of architectural decoration, as well of British as of foreign origin, it is desirable should be obtained to complete the collection in the South Kensington Museum. The paper of the evening was read by Mr. W. H. Picton, on "Architectural Reminiscences of Florence."

UNIVERSAL EXHIBITION IN PORTUGAL.—A letter from Oporto in the *Moniteur* says:—"The Crystal Palace, in which the International Exhibition is to take place, and the opening of which is definitively fixed for the 21st of August, 1865, is situate on a vast eminence called the Torre da Marca. By the side of the Torre da Marca is a quinta or country-house delightfully situate. The Crystal Palace Company has purchased a part of the park attached to the villa, and its fine shady walks will afford a pleasing recreation to the visitors of the Exhibition."

PRACTICAL SURVEYORSHIPS.—The Slough local government Board advertise that they are in want of a practical surveyor and inspector of nuisances for the Slough district, salary 50*l.* a year; and the Henley local government Board give notice that they are in want of a similar officer at a similar salary. "An Architect's Clerk," who writes us on the subject in a somewhat jocular vein, suggests that either office might prove an eligible one to some meritorious messenger or errand-boy. Doubtless the advertising boards know precisely what sort of men they want.

SHEFFIELD SCHOOL OF SCIENCE.—We are glad to learn, says the *Sheffield Independent*, that the School of Practical Science is not actually dead. The attendance of the "paying" pupils at the lectures at the Collegiate School has been so small that the project has proved a failure, as was very generally anticipated at the time when so important a public movement was started by being grafted on to a private speculation. The committee appointed at the town meeting have recently decided to take steps to carry out the plan of evening classes at some suitable place in the centre of the town. If this be done we have little doubt that an institution so valuable to the town will be well supported.

WORKING MEN'S INDUSTRIAL EXHIBITION AND BAZAAR AT BATH.—A sort of preliminary exhibition has been opened at Weymouth House. It is not pretended that it represents in anything like a complete and fitting manner the skill and industry of the industrious classes of Bath. The originators are the Working Men's Hospital Fund Committee, and they have endeavoured to copy the example set by the London Industrial Exhibitions from two motives,—a desire to encourage, as they express it in their rules, "inventive skill, excellence of workmanship, and the workmen's social improvement," and a wish to help the funds of the United Hospital. There are some 150 exhibitors, and 250 articles exhibited, but many of the latter are not the production of those who send them.

TELEGRAPHIC.—The French Council of State is about to introdnce a new system of telegraphy into operation through France. Hitherto only two sorts of apparatus have been in general use, viz., the needle and the alphabetic index instruments. The new one, invented, by Caselli, is to be autographic, so as to produce the telegram in the handwriting of the sender. The tariff is therefore regulated, not according to the number of words, but after the size of the sheet employed, and is to be as follows:—30 square centimètres (4·65 square inches) pay 6 francs, and so on in proportion, the sizes being 30, 60, 90, and 120. On these sheets of paper the public will be allowed to figure any correspondence, trade-mark, or drawing,—anything except secret writing. It was stated that this system would probably be in operation on the 1st of January. ——A miniature telegraph office, designed as a present to the Emperor of Russia, has been constructed by a citizen of New York. It consists of a complete telegraphic apparatus, capable of transmitting messages between Boston and New York, all embraced within the compass of a morocco case, 8 in. in length, 6 in. in width, and 3½ in. in depth.

MANUFACTURE OF PORTLAND CEMENT.—The prospectus of a proposed Cement Company just now issued says, with reference to works near Great Yarmouth, "The total cost of manufacture, including wear and tear of plant, is 17s. 6d. per ton. The wholesale price on board vessels at the works is 30s. per ton, giving a profit of 12s. 6d. per ton." The extent of the exportation of cement from the United Kingdom may be estimated from the statement that,—in the year 1862 (up to which time the returns have been made) the quantity of cement exported from the United Kingdom, in British and foreign vessels, amounted to 80,632 tons, value 202,050*l.*

THE BRIGHTON WORKHOUSE QUESTION.—The Poor-Law Board, on being informed by the Brighton Guardians of their reference of this question back to the vestry, and of the vestry's refusal to carry out the design, drew the attention of the Brighton Board to the fact that the vestry are not legally empowered to decide upon the extent of the workhouse accommodation which is necessary; and they urged the guardians to carry out the plans already sanctioned by the Board. Thereupon the Brighton guardians held a meeting, and they have resolved, *nem. con.*, to accept the tender of Mr. Jabez Reynolds, Brighton, for the execution of the whole of the works, for 30,500*l.*

POISONED WITH BAD WATER.—During the short space of one week, Mr. Freeman, the proprietor of this journal, has been robbed by death of three of his children, aged respectively six, four, and three years of age. This event is more harrowing from the cause to which it must be assigned. Not quite three months since, Mr. Freeman moved into a new abode at Twickenham. The system of drainage has proved to be so defective, that in one pint of water, pumped from the well by which the house is supplied, the analysts of the Royal College of Chemistry, in Oxford-street, found enough decomposed organic matter to account for the catastrophe. Mr. Freeman's children, in short, have been literally poisoned. Other members of the family are still suffering from this dreadful state of things; and it is greatly to be feared that the full weight of this calamity has not yet been realised.—*Christian Times.*

STONE-LIFTING BY FUNGI.—At Rickmansworth, Herts, according to a correspondent of the *Clerkenwell News*, the stone floor of a tap-room and kitchen was lifted from its bed, and on the stones being removed some hundreds of mushrooms of various sizes and species were discovered, varying from 3 in. diameter to 1 ft., they being variously—*Agaricus compestus*, *Agaricus Georgii*, and the *Oreades*, or Fairy-ring Mushroom. A still more remarkable instance was seen in the pig-sty at the rear of the premises. There were discovered under the stones several large specimens of the *Agaricus Georgii*, some of which were of the enormous weight of 16 lb. 2 oz., 14 lb. 7 oz., and 9 lb. 3 oz. The *Agaricus Georgii* has been known, according to Dr. Badham's work, to weigh 14 lb., but here this was exceeded by two pounds.

DISCOVERIES IN CONNEXION WITH PEAT MOSS. We hear from Stornoway, says a Glasgow paper, that a product likely to prove invaluable has been successfully extracted from peat moss by Mr. H. Counter, manager of the extensive works erected by Sir James Matheson, bart., M.P., for the utilisation of the peat on his estate at Lews, by converting it into oils and paraffine. Mr. Counter was struck with the apparent lubricating property of a preparation made by him of the tar distilled from the peat. By way of experiment he resolved to test its powers on the axles of his own gig, which was driven from 16 to 18 miles daily for above three months, and on examination, at the end of that period, it was found to answer beyond his most sanguine expectations, the axles and bushes being in capital working order, and containing enough of the material to last as long again. He immediately took the precaution of protecting it by a patent, and it is now used on railways, and consequently well adapted for all descriptions of vehicles such as carts, waggons, carriages, &c., being equal to any other grease in the market, and infinitely cheaper. Subsequently Mr. Counter discovered that the product of the distillation of peat possessed qualities of still greater value, having found, as we are informed, by an actual experiment, that it acts as an excellent preventive of the fouling of ships' bottoms. This discovery has also been covered by a patent.